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GLADSTONE CREEK
ENVIRONMENTAL ASSESSMENT

FOR PROPOSED ACTIONS IN PORTIONS
OF SECTIONS 14, 23, 26, 28 & 34
T15N, R5W

DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
CENTRAL LAND OFFICE
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I. PURPOSE/MANAGEMENT OBJECTIVES

A. Purpose

The Montana Department of Natural Resources and Conservation (DNRC) proposes to begin forest management and timber harvesting on state school trust lands in the Gladstone Creek area, west of Wolf Creek, MT in Lewis & Clark County. The purposes of these proposed actions are to generate revenue for the specific trusts from the harvest and sale of forest products (timber), and to restore stands, where possible to a condition that may have commonly existed historically. The proposed actions would start sometime after April, 1999 and would likely be completed by December 2001, with actions limited to a few months of actual work during this overall time frame.

B. Project Need

The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state institutions such as the school for the deaf and blind (Enabling Act of February 22, 1889, 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (SFLMP). The Land Board approved the SFLMP's implementation on June 17, 1996. The SFLMP outlines the management philosophy of DNRC in the management of state forested trust lands, as well as sets out specific Resource Management Standards for ten resource categories.

The Department will manage the lands involved in this project according to the philosophy and standard in the SFLMP, which states;

Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream...In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.

C. Project Objectives

To move forest stand, where possible, to a desired future condition that is characterized by the proportion and distribution of forest types and structures historically present on the landscape.

1. To restore forest stands, where possible, to a condition that had commonly existed historically.
2. To generate revenue for the specific trusts, from the sale of forest products.

D. Project Area

The Gladstone Creek area is located in mountainous terrain 4-5 miles east of the Continental Divide in Lewis & Clark County, Montana. The project area is approximately 6 air miles W-NW from the town of Wolf Creek, Montana, on the south side of the Wolf Creek County Road.

The various alternatives examined in this EA include proposed actions in Sections 14, 23, 24, 25, 26, 27, 28, 33, 34 & 35, T15N, R5W M.P.M. The actions on the private lands included on the above list are related to access, i.e., road use, maintenance or development. The proposed forest management actions are restricted to the state owned lands.

TABLE 1
State Owned Lands Gladstone Creek Project Area
S½ 14, T15N, R5W
N½, W½SW¼, SESW, NESE Sec. 23, T15N, R5W
Sec. 26, T15N, R5W
Sec. 28, T15N, R5W
Sec. 34, T15N, R5W

E. Relationship to SFLMP

In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (SFLMP) which established the agency's philosophy for the management of forested state trust lands. The management direction provided in the SFLMP comprises the framework within which specific project planning and activities take place.

The SFLMP also defines the Resource Management Standards which guided the planning of this proposed action, the Gladstone Creek Timber Sale. The SFLMP philosophy and appropriate resource management standards have been incorporated into the design of the proposed action.

F. Agencies with Jurisdiction

The proposals include various access options. The different routes would require different combinations of culvert and bridge installation or re-installations. For agency sponsored activities, these stream crossings would fall under the "124" permit authority of the Department of Fish, Wildlife & Parks. If crossings are required in the selected alternative, then the DNRC will apply to the DFWP for the required permits. Installations would be made in compliance with the conditions listed in any permit granted.

The proposed timber harvest also would fall under the local Sediment and Erosion Control Ordinance administered by the Lewis & Clark County Conservation District. The DNRC already contacted the C.D. as part of this assessments public scoping process. If an action alternative is selected, then the DNRC would make an official notification to the C.D. on the forms they specify.

Any activity which disturbs the naturally occurring surface vegetation falls under the jurisdiction of the local County Weed Board. The DNRC has a Revegetation and Weed Management Plan on file with the County Weed Board. As there are existing noxious weeds on some of these areas, the Weed Board was contacted during the public scoping process. If an action alternative is selected, then the DNRC would file a site specific Weed Management Plan with the Weed Board.

Slash burning involves two agencies. Lewis & Clark County usually requires parties to have a burning permit prior to igniting fuels. The Department of Environmental Quality regulates air quality.

The action alternatives would all generate some slash burning. If slash piles are to be burned, the DNRC would obtain the burning permit from the County (issued by the Helena Fire Dispatch Office). The DNRC is part of the Montana Air Shed Coordinating Group. Our burns are planned by that group to limit particulate production to acceptable levels.

G. The Decision To Be Made

There are two (2) decisions to be made regarding these alternative proposals. The first is to decide which management alternative would best meet the management objectives and the objectives of the SFLMP. The second decision is whether this EA adequately identifies the potential impacts of the selected alternative and the significance of those impacts.

H. Public Involvement and Issue Determination

Numerous private persons, agencies, companies operating in the area and special interest groups were contacted by mail starting in the summer of 1997 for comments. The general public was asked to reply through a legal ad published in the Helena Independent Record on

July 30, August 3 and 10, 1997. Specialists in the fields of Hydrology, Soil Science, Archaeology and Forest Practices within the DNRC were contacted. Input on wildlife impacts from the local Biologist in the Department of Fish, Wildlife & Parks was also obtained.

The full list of contacts is available in the project file at the Central Land Office as it is too lengthy to duplicate in this document.

After compiling all of the comments received from these sources, we have arrived at the following list of potential issues for this project area.

TABLE 2	
Potential Issues	
1.	Hydrology, Fisheries & Soils
2.	Right-of-Way
3.	Bull Elk Survival
4.	Noxious Weeds
5.	Threatened, Endangered & Sensitive Species

I. Potential Issues

1. Hydrology, Fisheries & Soils:

There is a concern that a reduction in timber cover, new road construction and log skidding activities may adversely affect water quantity (water yield, channel stability), water quality (physical or chemical attributes), site conditions (soil loss from erosion, soil nutrient losses) or fisheries.

2. Right-of-way:

The landowners in Gladstone and French Creek drainages have expressed a concern that road development associated with the proposed timber harvest will increase use by the public, trespass problems, and littering.

3. Bull Elk Survival:

There is a concern that cover removal and road construction may have a cumulative adverse effect on bull elk hunting season survival, which may already be feeling the effects of

high access levels and low security associated with subdivisions and/or previous logging efforts in hunting District 423.

4. Noxious Weeds:

Timber harvesting activities have the potential to import noxious weed species to an area, or to create site conditions favoring the spread of existing infestations.

5. Threatened, Endangered & Sensitive Species:

There is a concern that the proposed actions may adversely affect plant or animal species of special concern.

These potential issues will be addressed further in Chapters III & IV.

II. Alternatives

A. Introduction

This chapter will describe the various alternatives which have been developed for this project area. In addition to those which are described in detail, the DNRC briefly considered the following alternative which has been dismissed.

French Creek Private Access Route

In the initial proposal that was sent out for public comment, the DNRC included three access options, French Creek, Gladstone Creek and state owned access. The Gladstone Creek and state owned options became parts of the alternatives which will be described later in this chapter. The French Creek option is no longer under consideration. The private access route in French Creek passes through 13 different private lots. During access negotiations, the DNRC received a full range of favorable and opposing comments regarding this route. When two of the key lot holders strictly forbid access or even further negotiation in that regard, the DNRC ceased further consideration of that option.

Four alternatives remain under consideration.

Alternative A

Alternative A is the No Action Alternative. Under Alternative A, the State would conduct no timber harvest or management actions. The existing grazing licenses would continue unchanged where they occur. Wildfire suppression would continue. Numerous voluntary BMP road drainage improvements to the private portions of the access routes would probably not be done.

Alternative B

Alternative B is the Gladstone #1 Alternative. Under this alternative, access would be via the existing private road in Gladstone Creek. The bridge over Wolf Creek would receive some required maintenance. A variety of road surface drainage improvements would be made though the private lands in Sections 24 & 25, including repair or replacement of the third of four existing short span bridges over Gladstone Creek. Modifications to existing roads and some new road construction would provide access to Unit #1 in the NE¼ of Section 26, Unit 2 along the existing road in Section 26, Unit 3 in Section 28 and Units 4, 5 and 6 in Section 34 (see Figure 1 A & B). This access would include use of an estimated 3.3 miles of existing open road, construction of an estimated 1.3 miles of new permanent open road, construction of an estimated 1.5 miles of new permanent but locked closed after use road and obliteration of 0.3 miles of existing road.

Harvesting in Unit 1 would treat approximately 110 acres. The harvest would retain some large diameter high quality (timber form) trees, wildlife trees (snag recruitments, spike tops, cavity, broken tops, etc.) and clumps of submerchantable trees, yielding an unbalance uneven aged structure. Harvest would be by tractor skidding, with a partial tree length skidding of slash, retaining slash from limbs, culls and logging damaged lopped submerchantable trees on-site for nutrient cycling and erosion prevention.

Harvesting in Unit 2 would treat 15-16 acres in group or individual tree harvests within winch line distance of the existing road. The treatment would retain critical SMZ trees and yield an unevenaged stand structure. Harvest would be by ground lead, with tractors operating mostly from on the existing road. Slash would be tree length skidded due to fire hazard concerns along the road.

Harvesting in Unit 3 would treat approximately 28 acres. The harvest would use a mix of clearcut, clearcut with reserves (submerchantable patches) and seed tree systems (where some good form Douglas-fir could be retained). Logging would be by cable yarding using a partial tree length method, as described earlier. Excess slash would be loader piled below the road(s).

Harvesting in Unit 4 would treat approximately 20 acres. The harvest would use a mix of treatments similar to those described for Unit 3. Logging would be by tractor skidding with a partial tree length skidding of slash, as described earlier.

Harvest Units 5 & 6 would treat approximately 5 and 3 acres respectively. The harvest would use a mix of treatments similar to those described for Unit 3. Logging would be by cable yarding in Unit 5 and by tractor skidding in Unit 6. Slash treatments similar to those described for Units 3 & 4 previously.

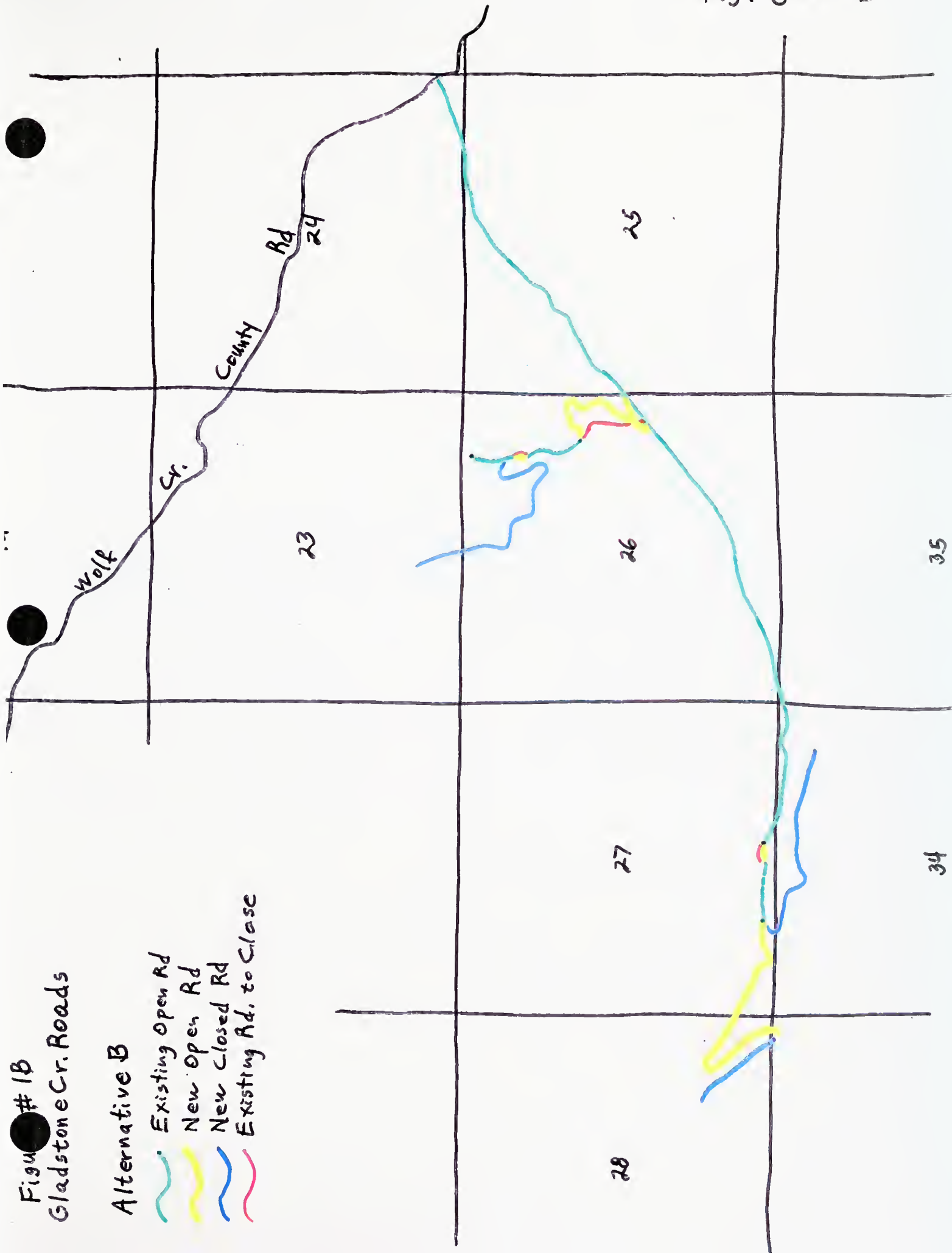
Figure #1A
 Gladstone Cr. Proposal Area
 T15N-R5W
 Alternative B
 1:24000



Figure #1B
Gladstone Cr. Roads

Alternative B

- Existing Open Rd
- New Open Rd
- New Closed Rd
- Existing Rd. to Close



Alternative C

Alternative C is the Gladstone #2 Alternative. This alternative would include everything already described in Alternative B plus the following. An estimated 1.4 miles of additional new road would be built on state land. This road would be permanent, but locked closed after use. This additional road would provide access to Units 7 & 8. An optional 0.25 miles of temporary work road at Unit 7 may also be built, and obliterated after use (see Figure 2 A & B). In total, this alternative would include use of an estimated 3.3 miles of existing open road, construction of an estimated 1.3 miles of new permanent open road, construction of an estimated 2.9 miles of new permanent but locked after use road, 0.25 miles of optional temporary road and obliteration of 0.3 miles of existing road.

Harvesting in Unit 7 would treat an estimated 11 acres. The harvest would likely be a shelterwood prescription, retaining a mix of Ponderosa Pine and Douglas-fir trees for seed and shade, yielding a 2 aged stand. Harvest would be by tractor skidding with a partial tree length slash treatment.

Harvesting in Unit 8 would treat an estimated 5 acres. The harvest and methods would probably be similar to those described for Unit 7.

Alternative D

Alternative D is the State Road Alternative. Under this alternative, access would be via a new road connecting to the existing state owned portion of the French Creek road in Section 14 (see Figure 3 A & B). A new bridge to cross French Creek would be installed and gated to prevent unauthorized access to the road system. New construction would then cross over a short ridge to Unit 8. From Unit 8 to the road junction with the Gladstone Creek road in the NESE of Section 26, this alternative would use the same proposed roads as Alternative C. The road junction at the Gladstone road would not be re-aligned, and use would not occur on the private portions of the Gladstone road in Section 24 & 25. Use above this point, through Sections 26, 27, 28, 33, 34, & 35 would be the same as proposed in Alternatives B & C. The end result being that access would include use of an estimated 1.9 miles of existing open road, construction of an estimated 1.2 miles of new permanent open road, construction of an estimated 3.2 miles of new permanent but locked after use road, 0.25 miles of optional temporary road and obliteration of 0.3 miles of existing road.

Harvesting would include Units 1 - 8 as previously described.

#2A

Gladstone Cr. Proposal Area

T15N-R5W

Alternative C

1:2400

harvest areas



Figure #2 A

Fig. #2B
Gladstone Cr. Roads

Alternative C.

- Existing Open Rd
- New Open Rd
- New Closed Rd
- Existing Rd. to Close

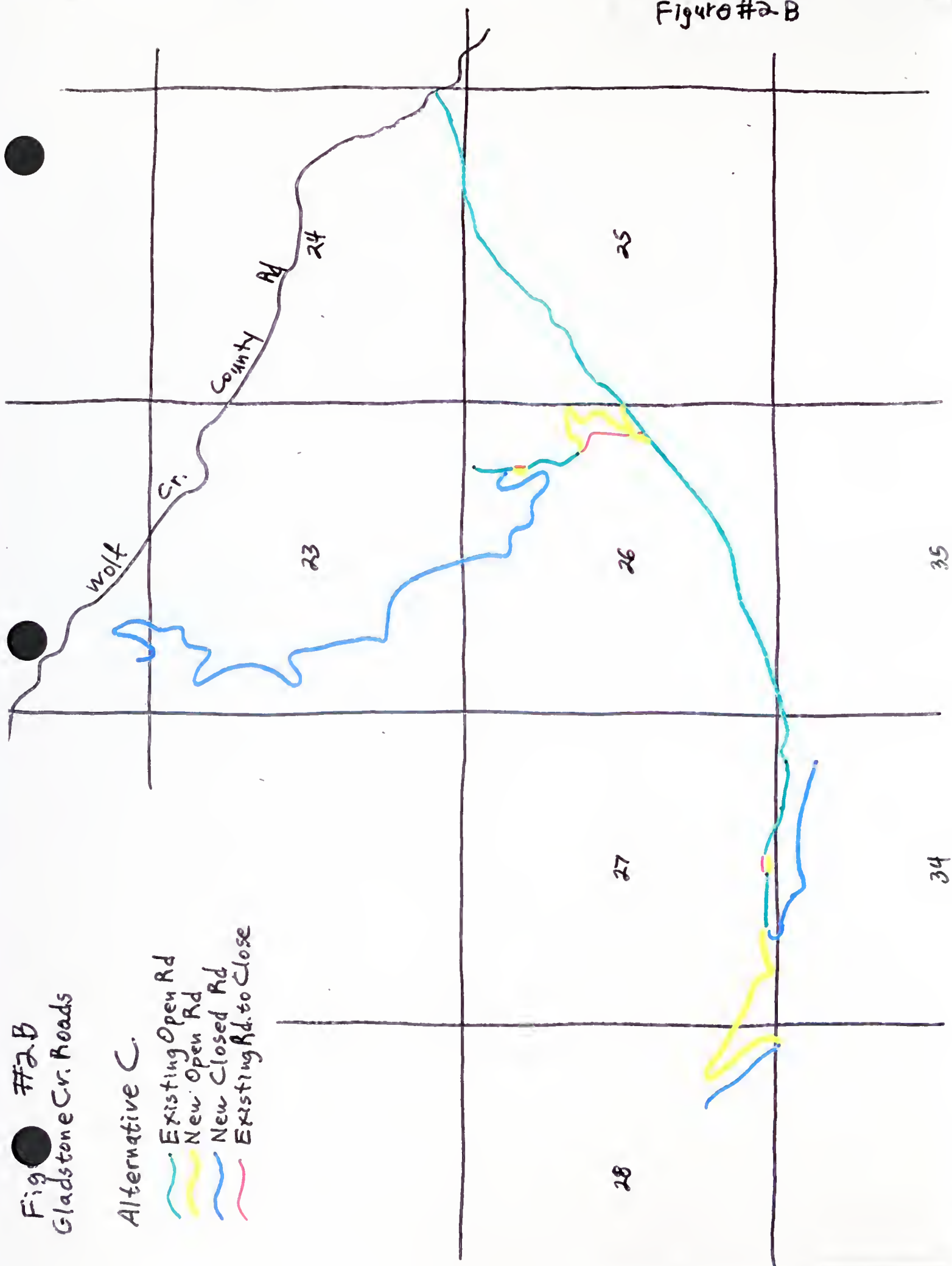


Figure #2B

Figure #3A
 Gladstone Cr. Proposal Area
 T15N-R5W
 Alternative D
 1:24000

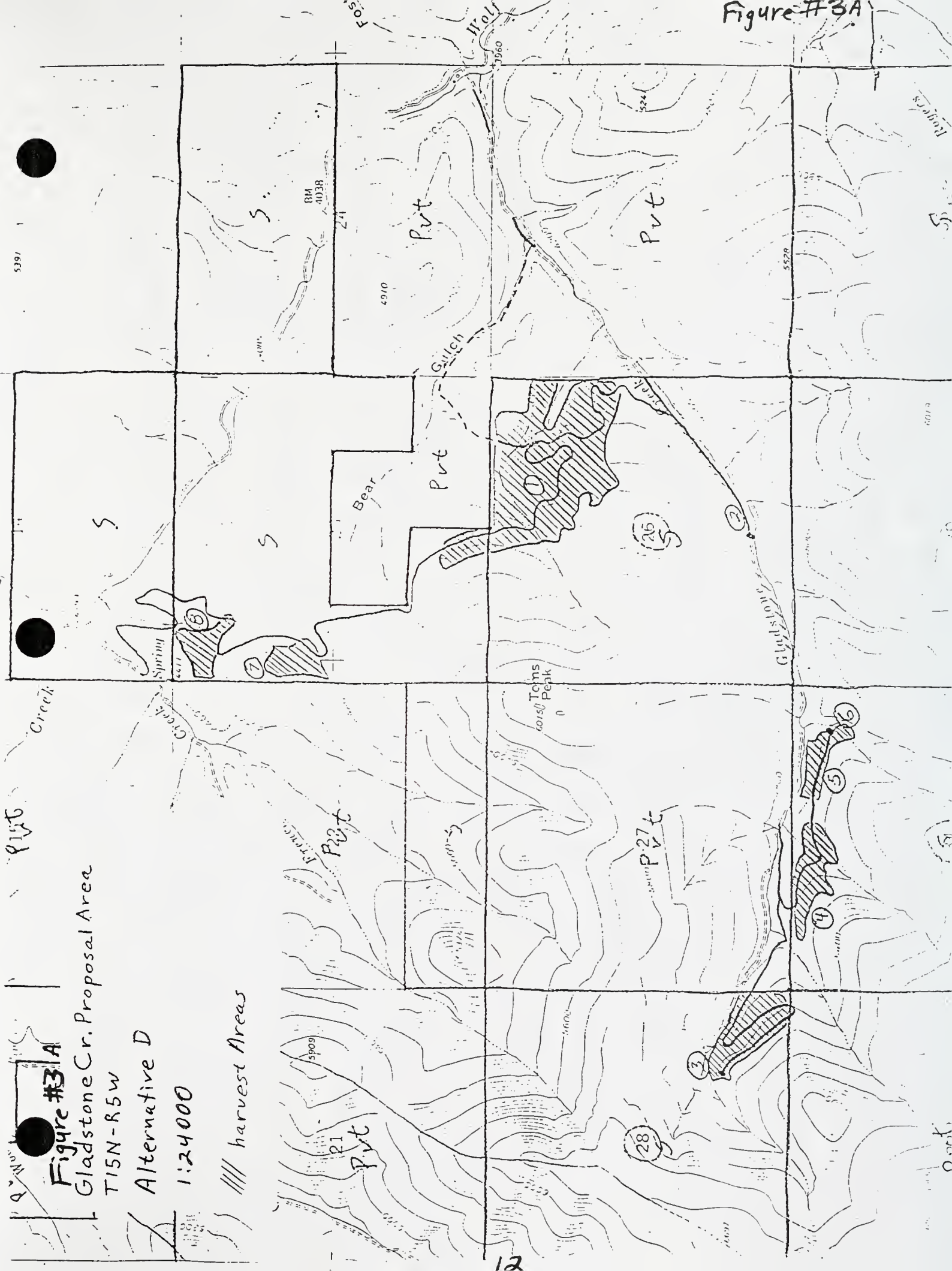


Figure #3A

Fig. #3 B
Gladstone Cr. Roads

Alternative D

- Existing Open Rd.
- New Open Rd.
- New Closed Rd.
- Existing Rd. to Close

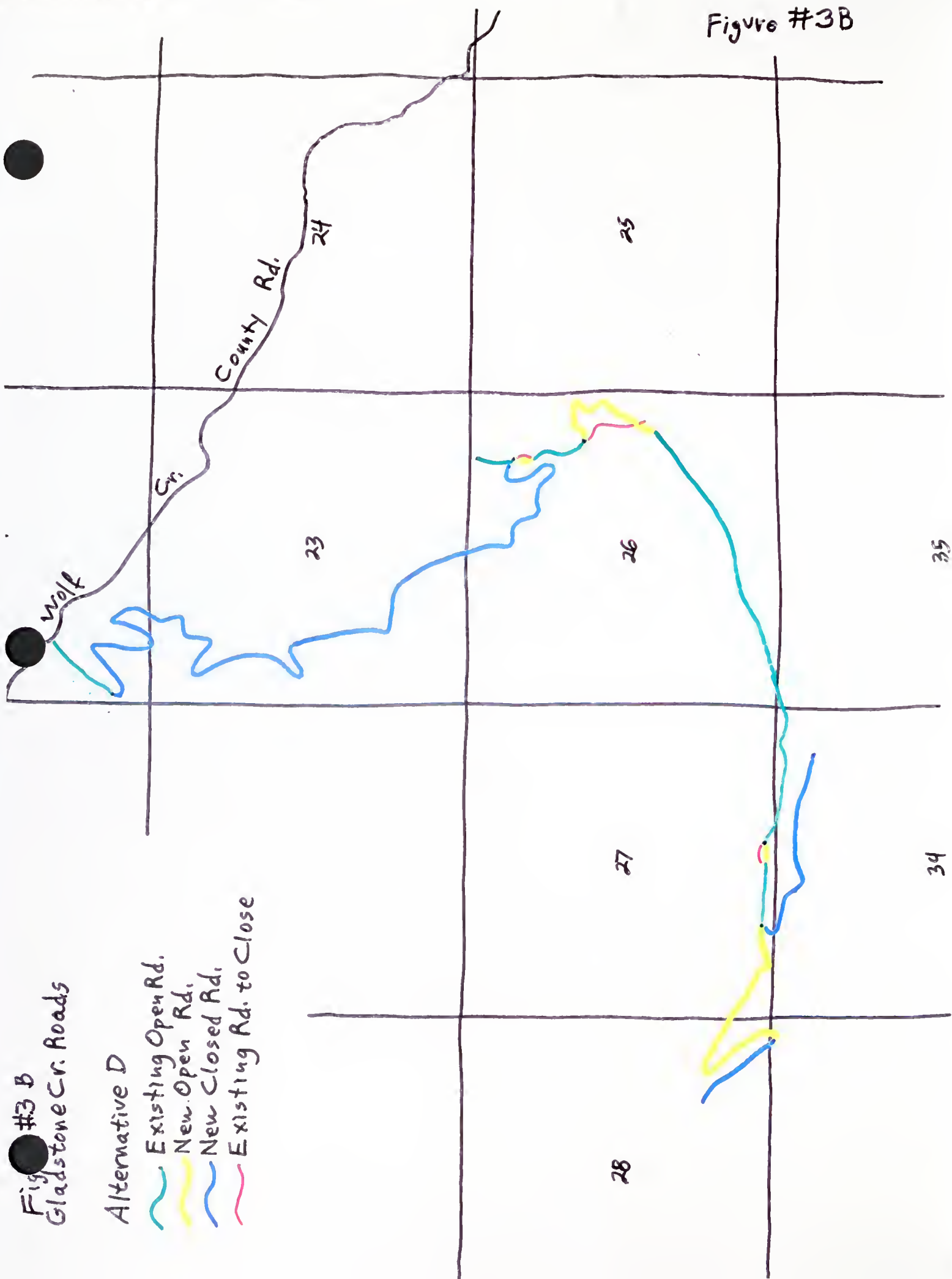


Figure #3B

C. Summary of Actions

TABLE 3
Summary of Actions

ALTERNATIVE	A	B	C	D
Existing Rd.Mi. used & maint.	0	3.3	3.3	1.9
New perm.open road miles	0	1.3	1.3	1.2
New perm. locked road mile	0	1.5	2.9	3.2
Opt. temp. road	0	0	.25	.25
Existing road mile obliterated	0	.3	.3	.3
# of harvest units	0	6	8	8
Est. harvest acres	0	181	197	197
Est. harvest volume	0	550-700	700-850	700-850
"124" Permits	none	7	9	9
Type	NA	1 or 2 bridge 6 or 5 CMP	1 or 2 bridge 8 or 7 CMP	1 or 2 bridge 8 or 7 CMP
Weed Plan by State	N	Y	Y	Y
Weed Control by Licensee	Y	Y	Y	Y
Slash burning, piles	N	Y	Y	Y
Wildfire Suppression	Y	Y	Y	Y
Non-motorized recreational use	Y	Y	Y	Y

TABLE 4
SUMMARY OF EFFECTS

ALTERNATIVE	A	B	C	D
Equiv. Clearcut Area (ECA) in Gladstone Cr. in French Cr.	no change no change	up 10% no change	up 10% up 1.8%	up 10% up 1.8%
Water yield change expected in Gladstone Cr. in French Cr.	no change no change	up 1% no change	up 1% up 0.2%	up 1% up 0.2%
Adverse downstream with BMP's followed	none	not likely	not likely	not likely
Adverse soil erosion & fertility with BMP's followed	none	not likely	not likely	not likely
BMP's decrease sedimentation on private road in Sec. 24 & 25	no	yes	yes	no
Local landowners retain long term access control	yes	yes	yes	no
New roads increase public vehicular access	no	no	no	no
Hunting legal access changes	no change	no change	no change	no change
Anticipated changes in hunting pressure	none	none	none	slight inc. due to walk-in use on new closed road
Acres of forest cover affected by harvest & road construction	none	~185 ac.	~205 ac.	~207 ac.
% of forest cover affected	0	7.8%	8.6%	8.7%
Remaining forest cover on state land	2369 ac. (100%)	2184 ac. (92.2%)	2164 ac. (91.4%)	2161 ac. (91.3)

Expected affects to bull elk given current hunting regulations	none	none	none	none
Expected acres of new weed infestations	none	none	none	none
Short term decrease in existing weed acreage due to state actions.	none	yes	yes	yes
Long term weed control dependent on landowners and leasees	yes	yes	yes	yes
Impacts to threatened or endangered species	none	none	none	none
Acres of Flammulated Owl habitat improved on	0	125 ac.	141 ac.	141 ac.
Acres of Piliated Woodpecker habitat decreased	0	110 ac.	121 ac.	121 ac.
Adverse affects to other sensitive species	none	none	none	none

III. Affected Environment

A. Background

The Gladstone Creek proposals include forest management and harvesting actions in several forest stands on the state owned portions of Sections 23, 26, 28 & 34, T15N, R5W. In addition, road access on state and/or private lands would occur in Sections 14, 24, 25, 27, 33 and/or 35, depending upon which alternative is selected.

This project area is in rugged mountainous terrain approximately 4-5 miles east of the Continental Divide, and approximately 6 miles W-NW from the town of Wolf Creek, MT. The project area includes the Gladstone Creek (third order) and French Creek (second order) drainages. These streams are tributary to Wolf Creek, which joins Little Prickly Pear Creek, which is tributary to the Missouri River.

This project area is a small subset of the climatic zone M332D, described in the February 1997 Losensky Report, prepared for the DNRC. In this report, Losensky analyzed historic data on age and species distributions. Table 4 shows the historic age/size class distributions for the 3 main species in this climatic zone.

TABLE 5
Historic Stand Structures (% of spp. area)

Species	Non-Stocked	Seed./Sap.	Pole	Mature	Old
PP	11%	47%	25%	10%	7%
DF	10%	31%	34%	14%	11%
LP	12%	31%	43%	6%	8%

The Gladstone Creek project area was evaluated for old growth and biodiversity in a landscape analysis. The initial analysis was completed 3/3/97 by the DNRC, with some table revisions on 10/16/98. (This report is attached as Appendix B.) The project area includes a gross area, private and state, of 5638 acres. The state owns 2413 acres (42.8%) of the project area. All state lands included in this project are "classified forest" lands by the DNRC. The state lands are 98.2% forested.

Most of the operable terrain in the analysis area was logged at the turn of the century, mostly prior to state acquisition. Since that time, regeneration and stand growth has increased overall tree density.

Approximately 30 years ago a wildfire of roughly 108 acres took place in Section 23. An estimated 34 acres of this burn was logged, either just before or just after the burn. There have been no other stand initiating events on these state tracts since the early 1900's.

The current stand structures on state owned lands in the analysis are summarized in Table 6. When you compare the data in Tables 5 and 6, you can see that the current age distribution is weighted much more to mature and old forest conditions than was the historic norm for this area. Old growth retention requirements from the SFLMP can be seen in Table 7.

Additional information on current stand conditions in the proposed harvest areas can be found in the Draft Silvicultural Prescriptions, Appendix E.

TABLE 6
Current Stand Structures (% of spp. area)

Species	Non-Stocked	Seed./Sap.	Pole	Mature	Old
PP	0	5%	0	26%	69%
DF	0	8%	31%	38%	23%
LP	0	0	28%	72%	0

TABLE 7
Old Growth Requirements from SFLMP

Species	Current Acreage	1/2 of Losensky	Minimum ac. per SFLMP	Current old stand acreage	Post harvest old stand acreage *
PP	699	3.5%	24.5	485	374-485, down 100-111
DF	1324	5.5%	72.8	113	113, no change
LP	346	4%	13.8	0	0, no change

*Unit 1 (Alt. B, C, & D) and Unit 7 (Alt. C & D only) contain 100 and 11 acres respectively, with current stand conditions classed old. Both stands are Ponderosa Pine type. No old Douglas Fir or Lodgepole Pine stands are proposed for harvest. Proposed treatments for Units 1 & 7 would retain many of the stand characteristics for "Old Growth" conditions. Consequently, this table is somewhat misleading when it shows old PP acreage reductions of 100-111 acres, the actual affect would be much less.

During the spring of 1998 the Ponderosa Pine in several of the valley bottom areas of the Wolf Creek drainage, including parts of this proposed area, experienced a significant amount of needle disease. The causal agent was Elytroderma deformans or Elytroderma needlecast. Infections from this fungus fluctuate from year to year, depending on the weather conditions when the spores are being released. The fungus infects and kills needles, and also invades twigs, causing localized brooming. Direct tree killing seldom occurs, but prolonged infections make trees more susceptible to bark beetles. Conditions should improve some time in the future.

B. Hydrology, Fisheries & Soils

Gladstone Creek is a 3,679 acre third order watershed with 89% forest cover. It is a Class I stream under the Montana SMZ law and rules, with both perennial and intermittently flowing stream segments. French Creek is a 1590 acre second order watershed with 91% forest cover. It is a perennial Class I stream.

This portion of the Upper-Missouri River Basin, including all of the Wolf Creek drainage, is classified B-1 in the Montana Water Quality Standards. Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonoid fisheries and associated aquatic wildlife, waterfowl and furbearers; and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above "naturally occurring" concentration in waters Classified B-1.

"Naturally occurring" means conditions or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present, and reasonably anticipated beneficial uses. The State of Montana has adopted Forestry Best Management Practices (BMP's) through its non-point source management plan as the principal means of meeting Water Quality Standards.

Existing beneficial uses in the immediate vicinity of the proposed sale area include water rights for ground water sources including: stock and domestic uses. Surface water sources include stock, domestic, fish and wildlife, lawn and garden and irrigation uses. There are no sensitive beneficial uses in the sale area, however; downstream sensitive beneficial uses include surface domestic uses and cold water fisheries.

The streams in the Gladstone and French Creek drainages are not listed in the 303(d) listing.

There was no fishery survey data available for either Gladstone or French Creek. Wolf Creek, however, has 1996 survey data indicating that west slope cutthroat trout occur rarely, and rainbow, brook and brown trout occur commonly. Wolf Creek is considered a very valuable spawning habitat for Missouri River rainbow trout. Recent surveys documented 1981 spawning redds in the lower 7.8 miles of Wolf Creek. Increased sediment levels may adversely affect this system.

Portions of the existing Gladstone Creek road would not meet BMP's if used in the current condition. The existing road system will continue to be a chronic source of potential sediment into the affected streams unless proper mitigation measures are taken.

There has only been minimal amounts of timber harvest in the Gladstone and French Creek drainages in the recent past. The existing equivalent clearcut area (ECA) is 8% & 14% for these two drainages respectively. The existing ECA for these drainages is well below standard accepted thresholds for ECA, which typically run from 25 to 30 percent (Pers Comm. 10/15/98 -- George Mathieus, DNRC hydrologist).

A primary soil concern in this area is to maintain soil depth and to avoid displacement of the shallow soils. In Sections 23 & 26 soils are a complex of Mocmont/Tolex (Unit 84F). Tolex soils are very droughty and generally low in fertility.

Section 34 soils are Trapps - Warnecke channery loams, forming in limestone. Trapps soils are deeper and sensitive to rutting and displacement if operated on when wet.

C. Right-of-Way

Lewis & Clark County holds and maintains a county road up Wolf Creek, providing the principle public access route in this drainage. Most other roads that branch off this county road are the property of the respective surface owner.

The road up Gladstone Creek begins on private land in Section 24. There are 8 different landowners along this route from the junction with the county road to the state section line at Section 26 (Shell, Smith, Turk, Root, Cox,¹ Blatter, Diver and Schneider). The state would need a right-of-way agreement from each of these, individually, to legally access Section 26 for logging via this route. Gates are present on the Turk and the Schneider property to control public access. These gates have not been use recently, but could be used again, at any time.

The Gladstone road then continues through the state land in Section 26. Private landowners farther up the Gladstone drainage apparently hold a permanent easement for ingress and egress originating from an

¹Actual ownership of this parcel is unknown, Cox sold property years ago, county records still show him as landowner. Property taxes have not been paid on this tract in recent years.

easement granted to the Tri-Peak Ranch (D-7412) in April 1980. This easement, 60 feet in width included permission to build and use the current road, including the harvest of the trees within the clearing limits of the road. The easement specifically provides however "... that the right of way granted herein is not exclusive and does not interfere with the grantor (state) and its successor, assigns or purchasers of state forest products ... their right, at all times to go upon, cross and recross the land", it further provided that the grantees rights "... shall not interfere with the grantor's use of adjacent land". As such, it appears that the state has a legal right to use this existing road in Section 26. The state allows the easement holders to maintain a locked gate approximately midway through Section 26 for their security.

The existing Gladstone road then passes through the extreme northwest corner of Section 35 (Anderson). As before, the state would need a right-of-way agreement from this landowner to use this road for logging.

The road then enters state land in Section 34. The existing road and easement situation here is the same as described for Section 26.

The road next enters the S½ of Section 27. In this section, the road lays on several private lots, all owned by one party (Turk, Baldwin). The state would need a right-of-way agreement from this landowner to reach proposed harvest units in Section 28 and 34.

The landowners in the Gladstone Creek drainage frequently commented that they liked their relative solitude. Many recounted the difficulties they had with trespass road use when the area was initially subdivided, as well as the expense they incur for weed control, litter control and road maintenance. These were the most often listed reasons expressed by the landowners in favor of their route vs. a state route. They felt that trespass, littering and increased maintenance and weed control would again be needed if the state built and left open a new road into the Gladstone drainage.

At French Creek, the existing road starts on state land in Section 14 and proceeds up the French Creek drainage to private lands in Sections 15 and 22. There is a locked gate at the state/private property line, maintained by the private landowners. These landowners hold a similar permanent easement for ingress and egress across state Section 14. As described previously, a potential access route to the proposed harvest area exists, utilizing private roads in French Creek. Two key lot owners forbid the state from crossing their land, so that access option is no longer considered.

Because the state technically has legal access to parts of this area via the county road and the state owned portion of the French Creek road, an access proposal for a new state owned road was examined. It was discovered that a new road could be built to connect this existing legal access with other existing roads in the proposed harvest areas in Section 23 and 26. This access proposal was

eventually incorporated into Alternative D. To prevent unauthorized use, a series of strategically located locked steel gates would be installed.

The Gladstone private road is 1.26 miles long, from the county road to the state Section 26 property line. Road work, primarily B.M.P. related, on this segment of road includes the following:

- Add two stringers to bridge over Wolf Creek, new decking, new running planks and curbing (mi. 0.05).
- Modify road drainage at the Bear Gulch junction to prevent direct discharge to creek (mi. 0.60).
- Add curbing and an approach drain dip at short span bridge #1 (mi. 0.70).
- Add curbing, an approach drain dip with sediment trap and a second drain dip at short span bridge #2 (mi. 0.80).
- Construct a new replacement bridge, 12' clear span, 12" more clear height than current bridge with elevated back draining approaches and sediment trap at existing short span bridge #3 (mi. 0.90). Also, 2 more drain dips at miles 0.92 and 0.99.
- Add curbing, replace 2 rotten deck boards, correct drainage of seep along road at short span bridge #4 (mi. 1.01), and install a drain dip and sediment trap at mi. 1.05.
- Replace an existing short culvert with a new 18" x 26' CMP (mi. 1.07).
- Additional drain dips at miles 1.08, 1.15 and 1.20.

Then once on the state land in Section 26, the following work is needed to correct an unusable approach angle where an existing road joins the Gladstone Road, as needed to route truck toward Unit 1.

- Drain dips at miles 1.27 and 1.29.
- New road construction starting at mi. 1.30 including approximately 300 feet of construction.

These work items are estimated to cost \$8,500. In addition, there would be private access fees and associated costs.

Access negotiations have included some lump sum fees and some fees based on the volume of harvest. Final cruising results will not be available until after a decision is made. Current estimates are a harvest of 550-850 thousand board feet (MBF). Road use fees are estimated to be \$5,000. Most of the access agreements are for a temporary right-of-way. The estimated access cost then, for this one time use, would be \$13,500.00.

The state route from the French Creek road would start with a new bridge over French Creek, followed by a through fill across the valley (to maintain a grade level with the existing road), and approximately 200-300 feet of full bench road with end haul of the excavated material. Once out of the SMZ, standard cut and fill construction would continue around the ridge to the NE corner of Unit 8. From this point, the roads proposed for construction are identical to Alternative C. There is a relatively heavy infestation of spotted knapweed along the existing French Creek road. Treatment of this would probably require several years of annual treatments.

The estimated cost of this permanent road connection, with initial weed treatments would be \$38,800.00. (\$25,300 more than the Gladstone temporary access.)

Non-motorized access to state owned lands in Section 14, 22, 23, 24, & 26 is possible via the county road. Persons using these sections for recreational purposes must purchase a Recreational Use License.

D. Bull Elk Survival

The Gladstone Creek proposals are in hunting District 423 (see Figure 4). This hunting district lays generally from Lyons Creek and lower Little Prickley Pear Creek, north to Highway 200 and Highway 287 including approximately 212 square miles. The current elk herd numbers approximately 350 animals.

Elk hunting in this district, as regulated by the DFWP, includes six weeks of archery hunting in September and October, and five weeks of general rifle season hunting in October and November. Hunting regulations for the fall of 1998 specify the following:

Sept. 5 - Oct. 18 Archery, Brow-tined bull or antlerless elk
 Oct. 25 - Nov. 29 Brow-tined bull
 Nov. 21 - Nov. 29 Brow-tined bull or antlerless elk
 100 permits by drawing for antlerless elk

There is very little observed hunting season survival of bull elk in all of hunting District 423. The DFWP attributes this poor survival to habitat deficiencies related to high access levels and tree cutting units associated with subdivision and/or logging efforts in this area. Aerial elk observations for the last three years can be seen in Table 8.

TABLE 8
 District 423 Elk Numbers

YEAR	TOTAL ELK OBSERVED	BULL ELK OBSERVED
1996	301	10 Spikes
1997	357	4 spike, 1 browtine
1998	346	NA*

*Flights in 1998 were after antler shed so bulls could not be counted separately.

The Wildlife Biologist for the DFWP reports very little hunting season survival of bull elk in all of hunting District 423. This hunting district includes forested mountainous areas of Lyons and Wolf Creek as well as extensive areas of open rangeland north to Bowmans Corners. Elk use is most common in only the south part of this district, south of Highway 434, an area of approximately 120 square miles. The Gladstone project is located in this area. The Gladstone and French Creek analysis area covers 5638 acres, or 8.8 square miles, which is 7.3% of the area south of Highway 434, or 4.1% of the hunting district.

Figure 4
Hunting District 423
~212 sq. mi.

Gladstone Analysis Area
~8.8 sq. mi.

The state owned land in the Gladstone and French Creek area is 98.2% forested. Most (94.5%) of these forested acres are pole size or larger trees, moderately stocked or better (greater than 50% canopy coverage). Therefore, we can assume that vegetative cover is present on much of the forested acreage in these drainages at this time.

Access is another key element of elk security. Currently, access is controlled, by the landowners. Based upon personal conversations with several of these landowners, very little hunting takes place in these drainages. They also discourage access by the public for safety, due to the urban interface nature of their private land. The public can legally access the state land by foot from the Wolf Creek County road, however most of the area immediately south of the county road is steep with cliffs, a deterrent to high levels of public use. Still, we must assume that some hunting takes place in these drainages, and that legal elk encountered by these hunters may be harvested.

E. Noxious Weeds

The primary noxious weed in the Gladstone area is spotted knapweed. Existing infestations can be found along the county road in Section 14, on private lands in the French Creek area, spreading from French Creek to the leased state land in Section 23, and scattered occurrences along the existing roads in Gladstone Creek.

The landowners in Gladstone Creek have used chemical control in the past, thus limiting weed occurrences there. The French Creek infestation is the most prominent at this time. The state's surface grazing license holder has been in contact with the Department regarding control actions which he is required to make on the license area in Section 23. In the absence of an action alternative, weed control on the grazing license area would remain with the grazing license holder.

If an action alternative is selected, which includes actions in the infestation area(s), then the DNRC would file a site specific management plan with the County Weed Board. This plan would most likely include chemical weed control activities on areas prior to site disturbances, such as road building. Biological control would probably also be prescribed for other nearby areas. The weed plan would include monitoring and treatment actions for the project area so any new infestations could be treated and eradicated early.

Equipment used on road and logging activities would be pressure washed prior to delivery to the site to prevent the direct transport of weed seeds. If equipment had to operate in areas of known infestation, it would be required that it be washed on site, prior to moving into weed free portions of the project area.

F. Threatened, Endangered & Sensitive Species

SFLMP Implementation Guidance currently includes the following species as threatened or endangered in the State of Montana:

Bald Eagle
Peregrine Falcon
Wolf
Grizzly Bear

Bald Eagles:

There are no known Bald Eagle nest sites in or near the project area (MNHP database). The project area is occasionally visited by Bald Eagles, but being outside the home range area of any known nest, there are no special management requirements needed for Bald Eagles. However, if an active bald eagle nest is discovered within 2 miles of the proposed sale area, contract administrators would suspend activities until consultation with biologists is accomplished. Bald Eagles will not be addressed further in this EA.

Peregrine Falcon:

There are no known Peregrine Falcon nest sites in or near the project area. Peregrines typically nest on mountain cliffs and river gorges. The project area does not contain the habitat elements typically used by Peregrine Falcons. Peregrine Falcons will not be addressed further in this EA.

Wolf:

There are no known den sites, rendezvous sites or recent sightings of wolves in the project area. Should den or rendezvous sites be located near proposed activities, contract administrators will suspend operations until DNRC biologists determine disturbance is no longer likely. Wolves will not be addressed further in this EA.

Grizzly Bear:

The Northern Continental Divide Grizzly Bear recovery area is located approximately 7 miles northwest of the project area (designated as beginning north of Highway 200). Because of this close proximity, there are occasional reports and sightings of Grizzly Bears in the general Wolf Creek, Lyons Creek areas, to potentially include the Gladstone Creek project area. The SFLMP implementation guidance does not include any specific management actions for areas outside designated Grizzly Bear recovery ecosystems. Standard timber sale contract language provides authority for the DNRC to suspend logging activity while consulting with the DFWP Biologist(s) or the USFWS, if a transient Grizzly Bear is sighted near active timber sale areas. Grizzly Bears will not be addressed further in this EA.

The SFLMP implementation guidance lists the following sensitive species for the Central Land Office. These species are considered routinely in project planning and evaluation:

Flammulated Owl
Boreal Owl
Black Backed Woodpecker
Pileated Woodpecker
Northern Bog Lemming
Lynx

Flammulated Owl:

The Gladstone Creek proposal area includes extensive contiguous acreages of the habitat types preferred by Flammulated Owls. SFLMP guidance dated 2/17/98 recommends that harvesting prescriptions in Flammulated Owl preferred habitat types emphasize the following:

1. Favoring seral ponderosa pine on sites where historical fire regimes favored it and where fire exclusion has resulted in increased abundance of Douglas-fir.
2. Retention and recruitment of older-aged ponderosa pines, or, secondarily, Douglas-firs, particularly on warmer, drier slopes.
3. Retention and recruitment of large-sized snags.
4. Opening up of dense stands (typically with stagnant Douglas-fir that is excessive in abundance due to fire suppression), towards a basal area of 35 to 80 square feet, particularly on warmer, drier slopes.
5. Avoiding an overly uniform stand (i.e., retention of occasional dense patches of shade tolerant species and shrubs).

Proposed harvest Units 1,2, 7 & 8 include suitable habitat types and the stand conditions generally described above. The proposed treatments (described previously in Chapter II Alternatives) for these stands would generally meet the above guidance. The effects to Flammulated Owls will be addressed in Chapter IV.

Boreal Owl:

Boreal Owl preferred habitat is mature spruce/fir forests, dominated by Englemann spruce, with representation by subalpine fir, Douglas-fir, western larch and minor amounts of lodgepole pine. Mature aspen stands are also frequently used. Stands used are usually over 5200' elevation. Younger stands, dominated by seral lodgepole pine are not preferred Boreal Owl habitat.

Preferred Boreal Owl habitat does not occur on the Gladstone Creek project area. Boreal Owls will not be addressed further in this EA.

Black-backed Woodpecker:

Black-backed woodpeckers prefer use of recently burned forest areas. The Gladstone Creek proposal does not include the salvage of burned timber. No recently (<5 year old) burned timber is present on the project area. Black-backed woodpeckers will not be addressed further in this EA.

Pileated Woodpecker:

Preferred habitat for Pileated Woodpeckers includes mature conifer forests, with a canopy dominated by large-sized western larch or ponderosa pine, with representation by Douglas-fir. Mature cottonwood stands are also frequently used. Pileated Woodpeckers nest in trees over 15" dbh, preferring those >20" dbh, larch, ponderosa pine or cottonwood preferred in that order. Large diameter coarse woody debris is also used as a feeding substrate.

Plan guidance dated 2/17/98 recommends retaining Pileated Woodpecker habitat in larger rather than smaller blocks, or if only smaller patches can be saved, to try and locate them close to other patches that will likely be retained. Guidance is also to retain snags, especially large diameter snags and broken top snags. To maintain pileated woodpecker habitat in a harvested stand use a selective harvest system which retains most of the trees >15" DBH, as well as snags and coarse woody debris in high abundance.

The Gladstone Creek proposal area includes stands with the preferred characteristics (excepting larch is absent), and Pileated Woodpeckers have been observed in nearby drainages. The effects to Pileated Woodpeckers will be addressed in Chapter IV.

Northern Bog Lemming:

Northern Bog Lemmings prefer bogs or fens with thick sphagnum moss mats. There are no such habitat areas on the Gladstone Creek Project area. Northern Bog Lemmings will not be addressed further in this EA.

Lynx:

There are several habitat elements preferred by Lynx, categorized generally as denning habitat and foraging habitat. For denning, Lynx prefer the following:

- mature or old-growth stand, 200 years old, northerly aspect
- numerous preferably "jack strawed" down stems
- greater than 50% canopy closure
- the above items on at least 5 acres and
- at 5000' elevation or higher
- low-intensity human development

The primary prey for Lynx is Snowshoe Hare, thus foraging areas for Lynx are those areas favorable to Snowshoe Hare use. Foraging areas for Lynx include the following:

- dense Lodgepole pine saplings
- foraging area connected to denning area by relatively dense forest with only low-intensity human development intervening
- foraging areas within 3.2 miles of denning habitat

The Gladstone Creek project area, which includes the Gladstone Creek and French Creek drainages, contains no suitable foraging habitat for Lynx. There are several old stands within the project area, some occurring on northerly aspects, at suitable elevations, but lacking a high component of down woody stems. However, there are no suitable foraging habitats within the recommended 3.2 mile distance from these marginally potential denning areas. Many of the private sections in Wolf Creek and its tributaries are subdivided, with high levels of human disturbance in the form of cabins and year long residences. The prognosis for increased human occupancy in the Wolf Creek drainage is high.

Considering these factors, it is apparent that the project area in specific, and the Wolf Creek drainage in general do not support habitats suitable for the survival and reproduction of Lynx. Lynx will not be addressed further in this EA.

IV. Environmental Effects

A. Introduction

This final chapter of the Gladstone Creek EA will describe the probable effects to those various aspects of the affected environment which were described in Chapter III.

B. Hydrology, Fisheries & Soils

The Department policy is to fully implement BMP's and to comply above and beyond the requirements of the SMZ law. Implementation of these conservation practices would protect the streams from sedimentation. Specific road surface drainage repairs and installation of a bridge or culvert at an existing ford, in Section 27 would improve the existing situation. The 2.8 - 4.5 miles of proposed new road construction would have minimal hydrologic impacts due to the proposed locations, the low soil erodibility and the ephemeral nature of the drainages at the road locations.

The proposed harvest treatments would increase the ECA by 10% in Gladstone Creek and 1.8% in French Creek. Based on stream modeling, we would expect these changes to increase water yield in Gladstone Creek by 1% and in French Creek by 0.2%. These changes are well below levels normally associated with detrimental water yield increases (typically greater than 10%) and channel impacts.

No long term impacts to downstream water quality or beneficial uses are expected to result from the proposed actions. The full report by the Department Hydrologist can be found in the appendix.

Soil erosion and displacement on the harvest areas would be minimized if operations were restricted to dry, frozen or snow covered periods. Tractor skidding would be limited to slopes generally less than 45% on Mocmont/Tolex soils and to generally 40% or less on Trapps-Warnecke soils, to further prevent displacement. Ground lead or cable yarding could be used on steeper areas.

In some areas designated or preplanned trails would be used, along with localized equipment restriction zones to protect micro sites within the harvest areas. A partial tree length system would minimize the number of equipment passes over the land, reducing the potential for displacement or excess scarification. In general, scarification would be limited to 30-40% of the harvest areas, or less. Where possible, 10-15 tons per acre of woody debris would be maintained on site for nutrient cycling to aid long term productivity.

Adverse soil impacts are not expected given the locations of the proposed harvest units and roads, if BMP's and the specific mitigations described above are implemented.

C. Right-of Way

As described in Chapter III, the private landowners in Gladstone and French Creeks currently control the motorized access. Gates and/or close supervision are used to prevent motorized access by the public. All private parties that expressed a preference, preferred that one of the existing routes be used vs. construction of a new route located fully on the state land.

Under Alternative A, the state would conduct no timber harvest and there would be no change to right-of-way status or use.

The access arrangements being negotiated for Alternatives B & C are for temporary right-of-way easements to be valid only for this one proposed timber sale. Following our proposed use, control would revert to the private landowners in Sections 24, 25 & 35.

The only exception to this is the related proposal for an easement exchange with Cindy Turk (and her father Dick Baldwin) in Sections 27, 28 & 33. This exchange would allow the state to acquire a permanent management (not public use) right-of-way across the private lands in the south half of Section 27 and on a few feet of road in Section 33. In exchange, the state would grant a permanent right-of-way across the proposed new road in Section 28, up to the point where the new switch back would corner on the ridgeline a couple of hundred feet west of the corners of Sections 27, 28, 33 & 34, T15N, R5W. This right-of-way exchange would be conducted under 77-5-115 M.C.A. which allows the trade of reciprocal easements on classified forest lands.

For Alternatives B & C, there would be a limited period of increased use of these roads, but following the sale use levels and status would revert to the current condition. No long term change would occur to the public access situation in this drainage. The state would need to renegotiate access through Sections 24, 25 & 35 for any future activity.

The access proposed for Alternative D is for a new connecting road built fully on state owned land, through Sections 14 & 23, joining with existing roads in Section 26. To prevent unauthorized motorized use, a series of strategically located locked steel road closures would be planned. With these closures in place, and appropriate signing, trespass motorized road use would be prevented. Monitoring would be required annually.

With this road, the state would have permanent use of a log truck usable road providing access for future management needs in portions of Section 14, and Sections 23 & 26, T15N, R5W. If permanent access could be negotiated with the one landowner in the NW¼ of Section 35, then the state would gain permanent road access to Sections 34 & 28 also. (Assuming the easement exchange in Sections 27, 28 and 33 described above is also completed).

SFLMP road management guidance, dated 2/17/98, recommends that we would only build roads necessary for current and near-term management objectives. In general, guidance is that we would plan

for the minimum number of road miles. The SFLMP recommends that roads not needed for management activities for three years or more be considered non-essential and that they be closed with slash and rocks to prevent unauthorized use and to prevent erosion.

Alternative A has no harvest and no new roads.

Alternative B has 1.3 miles of new permanent open road and 1.5 miles of new permanent but closed road for 2.8 miles total. The open road would be partially the easement exchange and partly modifications to reduce erosion problems to an existing trail in Section 26 by relocating it to more suitable terrain.

Alternative C has the same 1.3 miles of new permanent open road and 2.9 miles of new permanent but closed road for a total of 4.2 miles. (The extra 1.4 miles as compared to Alternative B as needed to reach from Unit 1 to Units 7 & 8).

Alternative D has 1.2 miles of the new permanent open road (part of the relocation from Alternatives B & C not needed here), and 3.2 miles of new permanent but closed road, for a total of 4.4 miles. The extra mileage being the connection from Unit 8 to the French Creek Road.

Located along the proposed road between Unit 1 and Unit 7 is the old regenerated burn area. Portions of this stand are overstocked now and other portions will be, as the existing regeneration matures. Access for thinning in this stand would be available if the road proposed in Alternative C or D is built. However, this management action is not needed within the next three years.

The DNRC has recently begun a landscape analysis for the Wolf Creek, Lyons Creek and Medicine Rock Creek drainages. This analysis being a preliminary step to the development of an initial proposal for helicopter yarding from state lands in these drainages. It is probable, but uncertain at this time, that access to the Gladstone area would again be needed for this future proposal. This future proposal, if made and selected, would probably occur within the next three years.

If Alternative D is selected, then future access to Gladstone would not need to be renegotiated for future management actions.

If the new connecting route in Alternative D is adequately locked, signed and monitored, then increased public use and its inherent problems would not likely occur. When no actions were expected for the next three years, then the SFLMP would give a priority to closing this road with slash and rocks to prevent long term problems while maintaining the bulk of the capital investment.

D. Bull Elk Survival

None of the alternatives would change the legal hunting access in these drainages. Alternative A has no actions, in Alternatives B & C access control remains with the private landowners as it currently is and in Alternative D the new road would be locked and hunters would be required to walk-in, as they are required to do now.

Under Alternative D, the new road from French Creek may promote some additional walk-in access by the public in Sections 14 & 23. The largest harvest area, Unit 1, would be located 1.9 new road miles from the access point. Only a limited percentage of hunters are likely to hike this far. Harvest Units 2 through 6 are located a considerable distance farther in and are not likely to be accessed by hunters on foot.

The proposed harvest units cover 181 acres in Alternative B and 197 acres in Alternatives C & D. These acreages represent 7.6% and 8.3% respectively of the forested state lands in these drainages. The harvests would affect 0.2 to 0.3 percent of the area south of Highway 434, or 0.1% of Hunting District 423. Potential elk security cover would remain unharvested on approximately 85% of the state land in the Gladstone and French Creek analysis area.

Considering the legal hunting access, the physical limitations of access, the preponderance of cover in these drainages and the existing hunting regulations, it is anticipated the proposed harvest will only slightly reduce the vulnerability of bull elk in this hunting district.

E. Noxious Weeds

Under Alternative A, noxious weed control would remain the responsibility of the private landowners and the state's surface grazing leasee. If an action alternative is selected, then the state would assume portions of this weed control responsibility. The primary area of concern would be to chemically treat weeds along the existing roads which would be used, to limit the potential for those spot infestations to spread to new areas. Existing infestations in any area of new construction would also be treated chemically, prior to construction.

Off road equipment would be pressure washed prior to delivery to the site. Some of this equipment would do road work in areas of existing infestations. When work was completed in those areas, the machine would be hosed off to remove plant material, seeds and soil which could be carrying seed, prior to moving the machine to a weed free portion of the project area.

Monitoring and chemical treatment of any new or persisting infestations in the harvest areas and along the roads would take place each year that the project is active, and for at least two years after completion. Chemical applications would be done by licensed applicators, in accordance with the labeled instructions.

Areas disturbed by road construction, skidding and log decking would be promptly seeded to grasses. Grass species would be selected based upon their ability to rapidly establish on the sites, to limit available areas for weed encroachment.

Implementation of these weed management actions have been effective on past harvest areas, preventing the introduction of new weeds and the spread of existing patches. A short term decrease in existing weed area is usually experienced. As weed control on existing infestations reverts to the originally responsible party after the sale, continued monitoring and control by those parties is needed for long term control.

If an action alternative is selected, then the state will file a Weed Management Plan, outlining these control actions, with the County Weed Board.

F. Threatened, Endangered & Sensitive Species

Threatened or endangered species for this area include Bald Eagles, Peregrin Falcons, Wolves and Grizzly Bears. As noted in Chapter III, there should be no effects to these species from the proposed project.

Sensitive species for the Central Land Office include Flammulated Owl, Boreal Owl, Blackbacked Woodpecker, Pileated Woodpecker, Northern Bog Lemming and Lynx. Of those, only Flammulated Owl and Pileated Woodpecker will be discussed in this chapter. There should be no affects to any of the other species listed.

Flammulated Owl:

Proposed harvest Units 1,2,7 & 8 include suitable habitat types and the stand conditions described in the SFLMP as potentially favorable for Flammulated Owl use. Habitat types observed in these units include Psme/caru, Psme/cage, Psme/feid, Pipo/Agsp, Pipo/feid and Psme/syal. (Listed from most common to least common.) Existing stand conditions are irregular multi-aged stands, Ponderosa Pine and Douglas-fir dominant in the overstories, with areas of younger Douglas-fir and some Ponderosa Pine codominant or as understory. Numerous snags and large down stems are present. Tree stocking is more dense now than has probably occurred in the past.

Alternative A would not treat any of these stands, leaving them densely overstocked. Densely stocked stands are not beneficial to Flammulated Owls.

Alternatives B, C & D would all treat proposed Units 1 & 2 in the same manner. Alternatives C & D would also treat Units 7 & 8. Treatments in each of these stands would include the following criterion.

- Occasional leave trees with good form and vigor would be selected from the 12" dbh and larger size classes. Ponderosa Pine would be favored, with Douglas-fir a second choice.

- Older trees and snags showing signs of rot, broken tops, nesting use etc. would be retained as much as possible. Human safety during the harvesting process dictates that some of these must be felled by equipment before people can work on-the-ground near those locations. This is an OSHA requirement.
- In areas of merchantable sized trees, the tree stocking would be reduced to a basal area of 35 to 80 square feet per acre. In most areas probably closer to the low end of this range.
- Some dense pockets of submerchantable size trees are present in these stands. To the extent possible, harvest operations would be directed away from these areas to maintain some non-uniformity to the post harvest stand.

These proposed actions emphasize the treatments listed in the SFLMP Implementation Guidance, as being favorable for maintenance of Flammulated Owl Habitat, thus being a benefit for Flammulated Owls from the existing condition.

Pileated Woodpecker:

The Gladstone Creek proposal area includes some stands with the characteristics apparently preferred by Pileated Woodpeckers. Pileated Woodpeckers have been observed in nearby drainages.

The biodiversity evaluation for the Gladstone area completed in March 1997 examined stand data on the state lands in Gladstone and French Creeks. Pileated Woodpecker preferred habitat includes mature conifer forests with a canopy dominated (in this area) by Ponderosa pine, with representation by Douglas-fir. (They prefer larch foremost, but larch is located mostly just west of the Continental Divide in Montana.) The biodiversity evaluation recorded 13 forest stands totaling 507 acres where the mature canopy was currently dominated by Ponderosa Pine, with some Douglas-fir. There are also small streamside patches of overmature cottonwood trees scattered along Gladstone and French Creeks. These stringers are too small to be identified as individual stands, but do provide potential Pileated habitat and a connective corridor up and down the drainages.

The 507 acres noted above includes proposed Unit 1 (portions of stands 23-15-5-17; 26-15-5-6 and 26-15-5-11A) for 110 acres and proposed Unit 7 (portion of stand 23-15-5-2) for 11 acres, for a total of 121 acres proposed for treatment in potential Pileated habitat.

Overall, there are probably 1000-1500 acres of potential Pileated habitat in the Gladstone & French Creek drainages when state and private land are considered. Rough terrain limits the potential for additional private logging in these drainages. Though some small scale harvesting would probably be expected, we can expect most of the habitat on the private lands to remain intact.

Studies quoting home range sizes from 150 to 1500 acres can be found in the literature. One study in the Northern Rockies (McClelland 1979:297) proposed a minimum of approximately 500 acres (200 hectares).

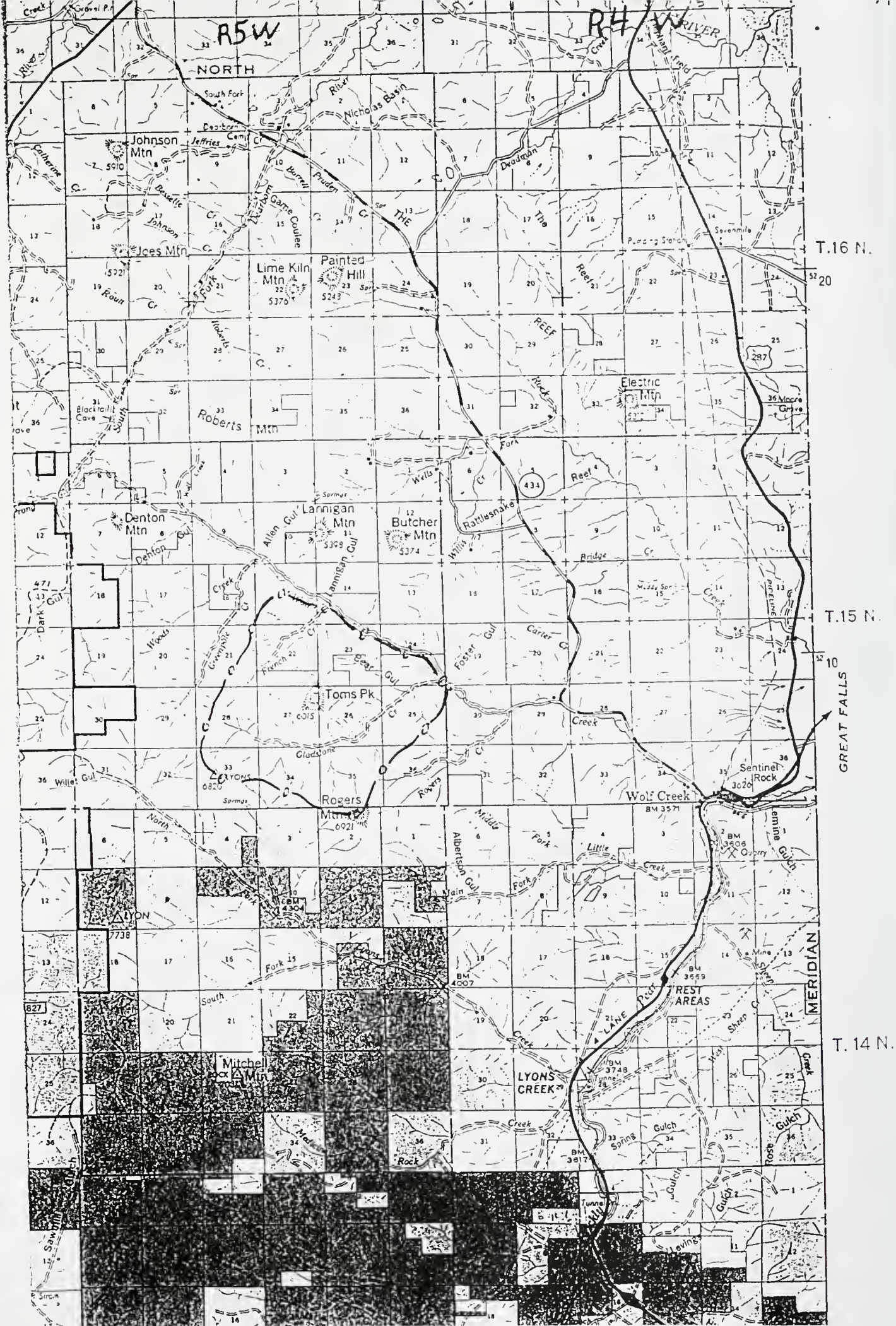
The harvest methods proposed would maintain most if not all of the large snags, and would probably increase the amount of large down woody debris. However, the stands could be too open for suitable Piliated habitat.

Under Alternative A, no state harvesting would take place. In this situation, the state land alone would probably meet minimum Piliated acreage requirements, and the state and private land together would probably satisfy even the largest estimates of home range size for a pair of Piliated Woodpeckers.

The Action Alternatives all include harvesting in Unit 1. If harvested as described (using methods that meet Department objectives for coarse filter biodiversity and fine filter objectives for Flammulated Owls) then harvest Unit 1 could be less suitable for Piliated Woodpeckers. Suitable snags and down woody material would remain, but the post harvest stand could be more open than Piliated Woodpeckers prefer.

This reduction in potential Piliated habitat would mean that the state land on its own, would probably no longer meet minimum home range requirements. However when the adjacent private land is considered, along with the probability of future logging on the private land, it would appear that ample connected habitat would remain in these two drainages to support a nesting pair of Piliated Woodpeckers.

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REVISED BIODIVERSITY AND OLD GROWTH EVALUATION FOR THE GLADSTONE CREEK PROJECT

The Gladstone Creek Project is being evaluated as a possible FY1998 timber sale area by the Helena Area Office of the DNRC. Gladstone Creek, along with its main tributary Bear Gulch, forms a third order watershed located north of Helena, Montana, south of the main stem of Wolf Creek in T15N, R5W.

The Gladstone Creek Basin was delineated on USGS 1:24000 topographic maps. To incorporate all potential access routes, and to provide for somewhat regular shaped boundaries for the analysis area, the French Creek second order basin was also included (this in spite of the fact that no harvesting is planned in French Creek, only one of the access options is. Furthermore, the French Creek drainage area is too small to stand on its own as an analysis area, and its adjacent position made it a logical inclusion for this evaluation.) Also included was an area of face drainages that flow directly to the main stem of Wolf Creek. In brief, this analysis area can be described as follows: Beginning at the confluence of Wolf Creek and Gladstone Creek, proceed south up a spur ridge to the Gladstone/Rogers Creek divide, follow that divide S.W. to the Rogers Mountain Lookout Tower, then turn N.W. and follow the Gladstone/Lyons Creek divide to Lyons Peak, then northerly along a divide separating Gladstone and French Creeks from the Greenpole and Woods Creek drainage, to a point in the SWNW Sec. 15-T15N-R5W, then easterly down the ridge to the confluence of French Creek and Wolf Creek, then down Wolf Creek to the point of beginning.

The total land area in this evaluation, both private subdivision and state classified forest school trust lands, comes to 5638 acres. Due to the somewhat checkerboard arrangement of parcels in this area, the state owns 2413 acres in this analysis area, i.e., 42.8% of the total. (See Table 1.) Of the 2413 state owned acres, there are 44 acres of nonforest (1.8%) with the remainder (98.2%) supporting a variety of forested conditions. (See Table 2.) Based upon casual observation of 1990 aerial photography and early field reconnaissance, these state tracts appear to be representative of the overall conditions in the analysis area (i.e., the private land forested vs. nonforested conditions are similar to the percentages on the state land).

Most of the operable terrain in this analysis area was logged at the turn of the century. Since that time, regeneration and stand growth has increased overall tree density in this area. In the mid-70's, portions of the private land were again selectively logged, and then subdivided into mostly 10-20 acre parcels. There was then another lull in activity until this current time. There are three active hazard reduction agreements in this project area, two in Section 35 and a third in Section 23.

The state land had one timber harvest of 34 acres (clear cut, no records) and a stand replacing wildfire of 74 acres, both in Section 23. There have been no other stand initiating events on these state tracts since the early 1900's.

Table 1
STATE LANDS WITHIN THE GLADSTONE/FRENCH CREEK AREA
(Total Area State & Private = 5638 ac.)

T14N-R5W	OLD FOREST	YOUNG FOREST	NON FOREST	TOTAL
Sec. 2	---	59	3	62
T15N-R5W				
Sec. 14	19	52	---	71
Sec. 16	4	15	---	19
Sec. 22	14	135	11	160
Sec. 23	160	268	10	438
Sec. 24	---	40	---	40
Sec. 26	215	405	20	640
Sec. 28	186	251	---	437
Sec. 34	---	491	---	491
Sec. 36	---	55	---	55
TOTAL	598	1771	44	2413
	(24.9% of State)		(1.8% of State)	(42.8% of Total)

GLADSTONE CREEK REVISED BIODIVERSITY AND OLD GROWTH ANALYSIS.

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Table 2

T-R	Sec.	Stand	Acres	Forest Type	Actual Age	Relative Age
T14N-R5W	Sec. 2	Stand 1	59	LP, DF & WLP 8 W	100	S**
		Stand 2	3	NF		
T15N-R5W	Sec. 14	Stand 4	11	D 9 W		S
		Stand 5	9	P 9 MP		S
		Stand 6	32	D&P 9 WM		S
		Stand 7	19	D 9 W		M
	Sec. 16	Stand 12*	15	D 7 W		S
		Stand 13*	4	NC - P9P		M
	Sec. 22	Stand 1	29	NC - D8W		S
		Stand 2	14	D 8 W		M
		Stand 3	11	NF		-
		Stand 4	20	D 9 WP		S
		Stand 5	9	NC - D8W		S
		Stand 6	21	D 9 WP		S
		Stand 7	56	D 8 W		S
	Sec. 23	Stand 2	15	P 9 M		M
		Stand 3	20	P 9 W?		M
		Stand 4	13	D 9 WM		S
		Stand 5	34	D 9 WP		S
		Stand 6	7	D 9 MP		M
		Stand 7	73	D 8 M		M
		Stand 8	7	P 9 P		S
		Stand 9	34	P 7 M (old cut)		S
		Stand 10	7	D 8 W		S
		Stand 11	10	NF		-
		Stand 12	45	P 9 P		M
		Stand 13	55	D 8 W		S
		Stand 15	74	D 7 P (old burn)		S
		Stand 16	28	D 8 W		S
		Stand 17	16	P 9 M		S

	Sec. 24	Portion 8	40	D 8 W		S
T15N-R5W	Sec. 26	Stand 1	17	D 8 M	150	S
		Stand 2	5	LP 9 WW	90	S
		Stand 3	80	D 9 MM	150	S
		Stand 4	42	D 8 W	90	S
		Stand 5	8	D 7 W	90	S
		Stand 6	140	P 9 MP	200+	M
		Stand 7	107	P 9 MP	135	S
		Stand 8	83	D 9 WM	170	S
		Stand 9	35	D 8 W	90	S
		Stand 10	28	D 9 WW	170	S
		Stand 11A	30	NC - P9MP		M
		Stand 11B	45	NC - P9MP		M
		Stand 12	20	NF		-
	Sec. 28	Stand 1	97	LP 9 WM	130	S
		Stand 2	87	LP 9 WW	100	S
		Stand 3	12	D 9 WM	150	S
		Stand 6	14	D 9 WM	85	S
		Stand 7*	41	NC - P9PP		S
		Stand 7*	186	NC - P9PP		M

	Sec. 34	Stand 1a	58	D 8 M	65	S
		Stand 1b	5	D 8 M	65	S
		Stand 2	34	LP 9 WM	100	S
		Stand 3	86	D 9 MP	125	S
		Stand 4	38	LP 8 W	90	S
		Stand 5	74	D 9 PP	120	S
		Stand 6a	17	D 9 WM	120	S
		Stand 6b	26	D 9 WM	120	S
		Stand 7	55	D 9 MP	90	S
		Stand 8	44	D 8 P	90	S
		Stand 9	28	D 9 WM	140	S
		Stand 12	26	LP 9 WM	120	S
T15N-R5W	Sec. 36	Stand 1	55	D 9 WP		S

*Only a portion of this stand is in the analysis area. Acres shown are for the analysis area, not the full stand.

**Relatives ages are based either upon known actual age, or observation of a significant number of large diameter extremely dominant tree crowns in the overstory, on the 1990 aerial photo.

Actual stand age structure is not available for all stands in the analysis area, furthermore, an arbitrary division by age in years is not always indicative of stand characteristics (canopy layers, snags, down woody material, etc.) associated with "Old Growth". Forest canopy structure is an "Old Growth" characteristic that can be assessed on aerial photography. In the Relative Age Column, a "M" indicates the presence of a significant number of large diameter extremely dominant tree crowns in the overstory, with other multiple lower canopy layers completing the overall stocking (based on 1990 aerial photos). A designation of "S" indicates that the stand has a single relatively uniform canopy layer.

Table 3
State Forested Lands Gladstone & French Creek - 1990

	Even Aged				Uneven Aged	
	7*	8	9	LP9	D&P9	NC
Acreage	131	571	113	249	961	344
Percentage	5.5	24.1	4.8	10.5	40.6	14.5

*7 = seedling/sapling, 8 = pole size 5" - 9" d.b.h., 9 = sawlog size >9" d.b.h.

The majority of the existing even aged seedling/sapling stands resulted from wildfire and a trespass (?) logging operation, both in Section 23. These disturbances happened about 25-30 years ago. The polesize and mature size even aged stands are all approximately the same ages. Sizes vary as a result of stocking level, suppression and other site factors. The LP stands tend to be in the higher elevation reaches of the analysis area (Sec. 28 and 34) while the P or D stands of even aged pole and mature trees are at mid- to lower-slope positions, generally speaking. The existing seedling/sapling stands would have been part of this group if they had not been interrupted previously.

It would appear that most of these even aged stands would have been initiated during a narrow time frame, possibly from only one or a few large wildfires. It would appear that the natural process for these even aged areas would be for stand initiation by total or near total stand replacing fire, followed by an extended fire free period of stand regeneration and development. The geographic scale of the stand replacing fires seems to be larger than this analysis area.

The uneven aged stands would have been swept by the same large scale fires, but due to lower fuel loadings the fires would not have been as catastrophic and many of the larger D&P would have survived. The lower fuel loadings would have been due to more frequent nonlethal underburns, possible due to slope position, aspect, etc.

Large areas of even aged interior forest classic old growth conditions do not appear to be historical for this area. Most likely, small patches, streamside stringers and park edges would have been expected to survive the larger fires. In the uneven aged areas, there would have been some old large trees scattered over the whole area, this represents a different type of old growth conditions.

Management Proposals

To maintain a semblance of the historical biological processes, it would be desirable to treat all of the forested lands within this analysis area within the next 0-50 years. The large scale treatments would include clear cutting, and seed tree cutting in the even aged areas, taking special care to reserve from cutting many of the draw bottom stringers, park edge clumps, etc., which would simulate survival of old growth patches. The uneven aged areas would be managed to perpetuate the uneven aged condition, but would also maintain some of the large trees, especially those with rot, cavities, broken tops, etc., to simulate that type of old growth. The uneven aged areas would then need more frequent treatments to prevent rapid restocking, possibly on 15-20 year cycles.

Other Constraints

The Department, besides hoping to manage for a semblance of natural conditions, is also constrained by the need to make profits for the school trust, to meet allowable cut levels, to comply with other laws and rules, and to operate within the physical operating limits of today's technology.

When these factors are brought into the formula, the potential areas for treatment are reduced from all forested lands in the analysis area, to mostly the NE¼ of Section 26 and a few other potential areas, depending upon the access route used.

Table 4

Forest Stands at Gladstone/French Creek that Both Need Treatment
and Can Potentially be Treated Today with Other
Constraints, All in 15N-5W

Sec. 14, Stand 6	A narrow band along a new road, if that road is built. Uneven aged.
Sec. 23, Stand 2	The full stand, adverse skid, even aged.
Sec. 23, Stand 4	A portion of this stand, on ridgetop if new road is built. Uneven aged.
Sec. 23, Stand 17	A small portion of this stand, above road on operable terrain, if road is built. Even aged.
Sec. 26, Stand 6	Most of this stand, except adverse skids from steeper draws, uneven aged, probably accessible with any of the 3 possible road options.
Sec. 26, Stand 10	Some selective removal from SMZ that can be done from existing road. Uneven aged.
Sec. 28, Stand 2	Only a small portion of this stand would be operable, probably requiring new road, also limited by SMZ concerns. Uneven aged.
Sec. 34, Stand 4	With a new road to south of creek, portions of this stand would be operable. Even aged.

The initial proposal should include 3 or 4 potential road systems.

- a) Existing roads in Gladstone Creek and Section 26
- b) Existing roads in French Creek and Section 26 with new road in 23 to connect
- c) New road only on state land in 14 and 23, connecting to existing road in Section 26 and Gladstone Creek
- d) Maybe also existing road in Gladstone Creek and Bear Gulch and Section 26

The harvest proposals should include all of the areas identified in Table 4.

D.J. Bakken
Forester, DNRC
3/3/97, Initial Report
10/16/98, Revised



Gladstone Creek
Project T15N, R34W

Analysis area
416.3 ac.

State lands within
the analysis area
309.4 ac (50.06%)

OR

Gladstone/French Cr.
Project T15N, R34W

Expanded analysis
area, 563.8 ac

State lands in Gladstone Cr.
French Cr.
Total state lands 340.3 ac
(42.80%)

~ first order cr.
~ second order cr.
~ third order cr.

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. LIST OF AGENCY & PERSONS CONTACTED

Agencies

DNRC

Hydrology - George Mathieus
Soils - Jeff Collins
Archaeology - Pat Rennie
Forest Practices - Bob Harrington

FW&P

Wildlife Biologist - Quentin Kujala
Fisheries Biologist - George Liknes

Lewis & Clark Co.

Commissioners
Conservation District
Weed Board

Organizations

Groups

American Fisheries Society
Montana Audubon
Ecology Center
Confederated Salish & Kootenai Tribes

Companies

F.H. Stoltze
Gist-Heishman & Assoc.
MT Wood Products Assoc.
Tri-Rivers Lumber
Weyerhaeuser Company

Individuals

R. Adkins	C. Diver	L. Jacques
D. Anderson	E. Diver	R. Jacques
K. Anderson	T. Dolan	B. Johnson
W. Anderson	M. Dolan	L. Jun
T. Austin	M. Dugre	J. Lawton
R. Austin	L. Duncan	R. Loague
K. Bailey	E. Eberly	D. Loomis
D. Baldwin	T. Fallat	C. Loomis
G. Baldwin	G. Ferree	E. Marks
K. Blatter	E. Ferree	S. Marks
J. Blatter	F. Fick	T. Michelotti
J. Brinkman	P. Fick	P. Michelotti
B. Broadway	V. Filardo	L. Miller
A. Broadway	D. Fox	R. Miller
E. Brown	J. Fox	L. Miller
A. Brown	J. Fuchs	R. Nelson
D. Butcher	C. Gibson	S. Nelson
H. Butcher	J. Gibson	M. Norem
J. Coleman	D. Goff	A. O'Reilly
	M. Goff	
E. Coleman	H. Golden	F. Palakovich
M. Colombe	J. Goldsmith	B. Palakovich
R. Colombe	S. Goldsmith	S. Paul
J. Cox	R. Graff	F. Pfeiffer
C. Currey	E. Harant	L. Roedel
D. Currey	W. Henderson	B. Rooney
E. Davis	E. Henderson	K. Root
R. Diebert	E. Hurd	D. Schneider
C. Dillon	A. Jacques	E. Schneider
E. Schuff	V. Schuff	D. Shell
Z. Slattery	D. Slattery	W. Smith
I. Smith	T. Sneva	S. Sneva
E. Soyland	M. St. Onge	M. St. Onge
R. Stainsby	G. Stainsby	D. Steen
C. Steen	C. Turk	T. Vincent
R. Vincent	B. Wadsworth	H. Wadsworth
R. Wheeler	J. Wills	M. Wills

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To: D.J. Bakken, Forester, Helena Unit

cc: Jeff Collins, Soil Scientist, Forest Management Bureau
Gary Frank, Hydrologist, Forest Management Bureau
Bill Schultz, Supervisor, State Land Management Section
Garry Williams, Manager, Forest and Lands Program

FROM: George Mathieus, Hydrologist, Forest Management Bureau

SUBJECT: Gladstone Timber Sale, Hydrologist Report

DATE: July 9, 1998

Hydrology Existing Conditions/Effects Analysis
Gladstone Timber Sale
T15N-R5W Sections 23, 26, 28, 34
Central Land Office, Helena Unit

INTRODUCTION

The following document contains background information for the watershed and hydrology portions of the proposed Gladstone Timber Sale E.A. This analysis will encompass three action alternatives and a no-action alternative. Writeup and assessments are based on a coarse filter screening approach, a water yield analysis, and an on-site field review of all contributing drainages within the proposed sale area.

POTENTIAL ISSUES

Water Quality:

Land management activities such as timber harvest and road construction can impact water quality primarily by accelerating sediment delivery above natural levels to local stream systems. These impacts are caused by erosion from road surfaces, skid trails and log landings and by the removal of vegetation along stream channels.

Cumulative Watershed Effects:

Cumulative watershed impacts can be characterized as impacts on water quality and quantity that result from the interaction of disturbances, both human-caused and natural. Timber harvest can affect the timing of runoff, increase peak flows, and increase the total annual water yield of a particular drainage. The amount of water yield increase is proportional to the percentage of the forest canopy removed from the watershed. In some cases, increased water yield brings about increased peak flows which may result in physical damage to stream channels, thus causing instability, loss of fish habitat, and downstream water quality impacts. The degree to which these effects occur depends on the interaction of many variables including soils, bedrock geology, the size and timing of storm events, harvest prescription and project design.

AFFECTED ENVIRONMENT

Setting:

The proposed timber sale area is located across four different parcels of State land that lie within both the French and Gladstone Creek watersheds. Both drainages are tributaries to Wolf Creek near Wolf Creek, Montana, approximately 34 miles Northwest of Helena, Montana. State ownership is entirely surrounded by

private landowners, comprised of homesites, ranch land and private timber lands. Gladstone Creek is a 3679 acre third order watershed with 89% forest cover. It is a Class I stream under the Montana SMZ Law and Rules, with both perennial and intermittent surface flow. French Creek is a 1590 acre second order watershed with 91% forest cover. It is a perennial Class I stream.

The proposed sale watershed analysis area has been further divided into 8 unnamed tributary watersheds draining Gladstone Creek and Wolf Creek to facilitate hydrologic analysis and cumulative watershed effects assessment. A description of those drainage areas follows:

Tributary # 1: This 204 acre watershed is a perennial Class I stream that receives approximately 25 inches of annual precipitation. This first order tributary flows through a very steep draw at approximately 5% gradient. Surface flow was lost 100 feet upstream of the confluence with Gladstone Creek.

Tributary # 2: This 150 acre watershed is an intermittent Class II drainage that receives approximately 25 inches of annual precipitation. The upper reaches showed no signs of surface flow this year, however, there was surface connectivity with Gladstone Creek.

Tributary # 3: This 171 acre watershed is an intermittent Class II drainage receiving approximately 25 inches of annual precipitation. The total acreage has been combined with tributary # 4 to accommodate the relative small area. There were no signs of surface flow contributing to tributary # 4 at the time of field inspection.

Tributary # 4: This 171 acre watershed is an intermittent Class II drainage receiving approximately 25 inches of annual precipitation. Surface flow only existed above the confluence with tributary # 3. There was no surface flow to Gladstone Creek, however, there was concentrated spring seepage and flow at the mouth, but flow contributed to an old channel bed that is disconnected from the mainstem of Gladstone Creek.

Tributary # 5: This 262 acre watershed is an intermittent Class II drainage that receives approximately 25 inches of annual precipitation. The majority of the landscape surrounding this drainage is very dry and bony ground. The upper reaches had isolated segments of ponded surface water and spring seepage. The middle portion had a short reach of surface flow. The lower portion of the drainage had defined bed and banks with no surface flow or surface connectivity to Gladstone Creek.

Tributary # 6: This 54 acre watershed is ephemeral draw with no evidence of any recent surface flow.

Tributary # 7: This 42 acre watershed is a Class III stream, with segments of both surface and subsurface flow. This drainage may contribute seasonal surface flow to Bear Gulch.

Tributary # 8: This 40 acre watershed is a Class III stream that contributes seasonal surface flow to French Creek.

Regulatory Framework:

This portion of the Upper Missouri River Basin, including all of the Wolf Creek drainage, is classified B-1 in the Montana Water Quality Standards. Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonoid fishes and associated aquatic wildlife, waterfowl and furbearers; and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above "naturally occurring" concentrations in waters classified B-1 (ARM 16.20.618 2(f)).

"Naturally occurring" means conditions or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. "Reasonable land, soil and water conservation practices" include methods, measures or

practices that protect present and reasonably anticipated beneficial uses. The state of Montana has adopted Forestry Best Management Practices (BMPs) through its Non-point Source Management Plan as the principal means of meeting Water Quality Standards.

Existing beneficial uses in the immediate vicinity of the proposed sale area include water rights for groundwater sources including: stock and domestic uses. Surface water sources include stock, domestic, fish and wildlife, lawn and garden and irrigation uses. There are no sensitive beneficial uses in the sale area, however; downstream sensitive beneficial uses include surface domestic uses and cold water fisheries.

The Clean Water Act and EPA Water Quality Planning and Management Regulations require the determination of allowable pollutant levels in 303(d)-listed streams through the development of Total Maximum Daily Load (TMDL) limits. The streams draining the four state sections are not 303(d)-listed streams. Little Prickley Pear Creek (MT41QJ003-2), however; is listed as a water quality limited water body (as per Section 303(d) of the Clean Water Act) in the 305(b) report. The causes of impairment are flow alteration, other habitat alterations and siltation with the probable sources being agriculture, construction and irrigated crop production. According to this report, Little Prickley Pear Creek is fully supporting of all its uses except aquatic life support and cold water fishery-trout which is listed as partially supporting.

The Montana Streamside Management Zone Law (MCA 77-5-301) and Rules regulate timber harvest activities that occur adjacent to streams, lakes and other bodies of water. This law prohibits or restricts timber harvest and associated activities within a predetermined (SMZ) buffer on either side of the stream. The width of this buffer varies from 50-100 feet, depending on the steepness of the slope and the class of the stream. Both Gladstone Creek and French Creek are Class I streams

The Montana Stream Protection Act (MCA 87-5-501) regulates activities conducted by government agencies that may affect the bed or banks of any stream in Montana. This law provides a mechanism to require implementation of BMPs in association with stream bank and channel modifications carried out by governmental entities. Agencies are required to notify the Montana Department of Fish, Wildlife and Parks (MDFWP) of any construction projects which may modify the natural existing conditions of any stream.

Fisheries:

There was no survey data available for either Gladstone or French Creek. Wolf Creek, however, has 1996 survey data that found westslope cutthroat trout rarely occurring and rainbow, brook and brown trout with common occurrence. Personal communication with Montana Department of Fish Wildlife and Parks (MDFWP) Region 4 fisheries biologist revealed that Wolf Creek is considered a very valuable spawning habitat for Missouri River rainbow trout. Recent surveys documented 1,981 spawning redds in the lower 7.8 miles of Wolf Creek. Concerns are that increases in above natural levels of sedimentation may adversely affect this system.

EXISTING CONDITIONS

Water Quality:

Access to the sale area is provided by approximately 2 miles of county road (Wolf Creek road) and an existing low standard road system located on private and State ownership (Gladstone Creek road). Portions of the existing Gladstone road are poorly located, in poor condition and do not currently meet minimum BMPs. Most of the road lacks adequate surface drainage which has resulted in undesirable concentrations of surface runoff. There are several segments of the existing road that follow right up the draw relatively close to the stream. One existing bridge crossing along the mainstem of Gladstone Creek is poorly designed and currently restricting the flow of the channel. Several other crossings are functioning well, but lack appropriate mitigation measures that could further reduce the risk of sediment delivery. The

existing road system has three drive-thru fords crossing Gladstone Creek. All three are well armored and one had no surface flow at the time of inspection, however, these crossing sites potentially contribute direct sediment delivery into the channel. The existing road system will continue to be a chronic source of potential sediment input into the affected streams unless remedial action and proper mitigation measures are undertaken.

Cumulative Watershed Effects:

Past management activities in both Gladstone and French Creek drainages include grazing, fire suppression, road construction and timber harvest. Timber management activities in both drainages have been minimal over the past 30 years. Harvesting has been limited to small clearcuts and selective cutting. The total past timber harvest represents 12% of Gladstone Creek's total area and 22% of French Creek. Portions of each watershed have been developed for home sites with minimal forest crown removal. A salvage harvest occurred within the Gladstone basin after a fire burned in Bear Gulch. Other tree harvesting has been limited to the removal of dead standing trees for firewood use.

All stream channels and ephemeral draw bottoms draining the proposed sale area were inventoried and evaluated by a DNRC Hydrologist. Stream channel evaluations (Pfankuch, 1975) were used to assess stream stability and impact of development and past management activities. Both French Creek and Gladstone Creek and their tributaries were found to be in relatively stable condition. Portions of the mainstem of Gladstone Creek showed evidence of past peak flow events resulting in channel adjustments. These were limited to isolated reaches with gullies and debris torrent/bedload deposition along old abandoned channel bottoms. It appears that these secluded reaches were the result of natural catastrophic peak flows that did not result in increased water yields from timber harvest. The reaches containing these features are not located directly downstream of any past timber harvest.

A cumulative watershed effects analysis was completed by DNRC to determine the existing conditions of the proposed sale area. Gladstone and French Creek were analyzed using the Equivalent Clearcut Area (ECA) methodology outlined in Forest Hydrology Part II (Region 1- USFS, 1974). ECA is calculated as a function of area (acres) treated, percent forest crown removal, precipitation patterns and estimates of the amount of hydrologic recovery due to vegetative regrowth. The results of the ECA analysis are summarized in the table below:

GLADSTONE PROPOSED TIMBER SALE Watershed Existing ECA Analysis Data						
Watershed	Drainage Pattern	Total Acres	Existing Harvest ECA	Existing Road Miles	Total ECA	Area in ECA
Gladstone Creek	Perennial	3679	280	5.5	297	8%
French Creek	Perennial	1590	218	1.3	222	14%

Field evaluation and results from the cumulative watershed effects analysis indicate that past management activities within the proposed sale have resulted in impacts to water quality. These impacts are limited to sediment delivery and erosion from roads and are restricted to stream crossings and isolated segments of existing road located adjacent to Gladstone Creek. There is no evidence of cumulative watershed effects resulting from past timber harvest in either watershed.

ENVIRONMENTAL CONSEQUENCES

The proposed timber sale is comprised of three action alternatives. Alternative B prescription is to treat approximately 181 acres with selection harvest and clearcut with reserves. This treatment would remove

approximately 38-88% of the existing crown cover. Approximately 3.3 miles of existing low standard road would be improved to meet minimum BMPs, 2.8 miles of newly constructed road and .3 miles obliterated existing road. Alternative C would treat approximately 197 acres with similar prescriptions to Alternative B, but with a total of 4.2 miles of new road construction, and .25 miles of temporary road. Alternative D would treat the same units as alternative C, but would have a total of 4.5 miles of new road construction and .3 miles of existing road obliterated.

Water Quality:

Harvest units can directly impact water quality if not properly located or buffered. The risk of impacts is greatest along streams, wetlands and lakes. The Streamside Management Zone Law (SMZ Law) regulates forest management activities that occur adjacent to streams, lakes or other bodies of water. All proposed activities will be conducted in accordance with the SMZ law and Rules. All areas requiring SMZ delineation have been field reviewed by DNRC Hydrologist and Soil Scientist to determine their adequacy in meeting the requirements of the law and satisfying the SFLMP guidance to protect water quality and aquatic resources. No long term impacts to downstream water quality or beneficial uses are expected to result from the proposed action alternatives.

In addition to the watercourses assessed and evaluated, the rest of the proposed sale area is comprised of ephemeral draws that lack discernable stream channels. Equipment operation restrictions and designated crossings will be utilized to protect all ephemeral draw bottoms.

The primary risk to water quality is associated with roads, especially roads constructed along or crossing streams. Alternatives B & C include 2.8 and 4.2 miles of proposed new road construction respectively, along with a new bridge crossing for Gladstone Creek in section 27. The new bridge crossing along Gladstone Creek will replace the current drive-through crossing located at the Baldwin homestead. Improvements will be made to address a spring currently seeping out of the road fill and installing road surface drainage away from the crossing. Construction of this bridge site will also relocate a short segment of existing road with a steep approach grade to the current crossing. This relocation will eliminate the other two drive-through crossings along Gladstone Creek. There are a variety of bridge designs and mitigation measures that may be used for this crossing site. A corrugated steel open-arch pipe may also be used to replace the current drive-thru crossing at Gladstone Creek. Utilization of a bottomless arch rather than a cylinder pipe provides similar benefits to that of a bridge crossing. The benefits to utilizing a bottomless arch pipe include: maintaining natural stream bed gradient, allowing the natural channel bed to remain undisturbed, less inlet control and constriction on velocity and stream energy, and providing for better fish passage. Site specific design standards will be fully addressed in the sale contract. DNRC will fully utilize all mitigation measures to ensure the fullest protection of soil and water resources.

Is this a new creek?

Action alternative D includes 4.5 miles of proposed new road construction and a permanent bridge crossing for French Creek. The new bridge crossing proposed for French Creek will utilize similar design and mitigation specifications as the Gladstone crossing.

DNRC will utilize all reasonable mitigation and erosion control practices during the design, reconstruction and construction of all roads, stream and draw crossings. Site specific design recommendations from DNRC Hydrologist, Soil Scientist and MDFWP Fisheries Biologist will be fully implemented under each action alternative. All stream crossing sites are subject to approval from MDFWP through the permitting process required under the Montana Stream Protection Act. All provisions and mitigation measures stipulated in the 124 permit will be fully implemented.

Approximately 3.3 miles of existing low standard road will be improved under each proposed action to a standard that meets minimum BMPs. These improvements include replacing a poorly designed bridge crossing; replacing an undersized and poorly designed culvert crossing; and improving safety and mitigation measures on several existing bridges. Mitigation measures will be implemented to insure appropriate road

surface drainage. Improvements to the existing road system are expected to decrease existing and future risk of sediment delivery to streams.

Some short term impacts to water quality may occur due to sediment induced at stream crossing and ephemeral draw bottoms during or shortly after construction activities. The 2.8-4.5 miles of proposed new road construction for all action alternatives are considered to have minimal risk to water quality and beneficial uses due to the following reasons: 1. Their location along the landscape. 2. Soil erodibility. 3. The ephemeral nature of the adjacent stream channels. Proper application of BMPs and site specific designs and mitigation measures will reduce erosion and potential water quality impacts to an acceptable level as defined by the water quality standards. Acceptable levels are defined under the Montana Water Quality Standards as those conditions occurring where all reasonable land, soil and water conservation practices have been applied.

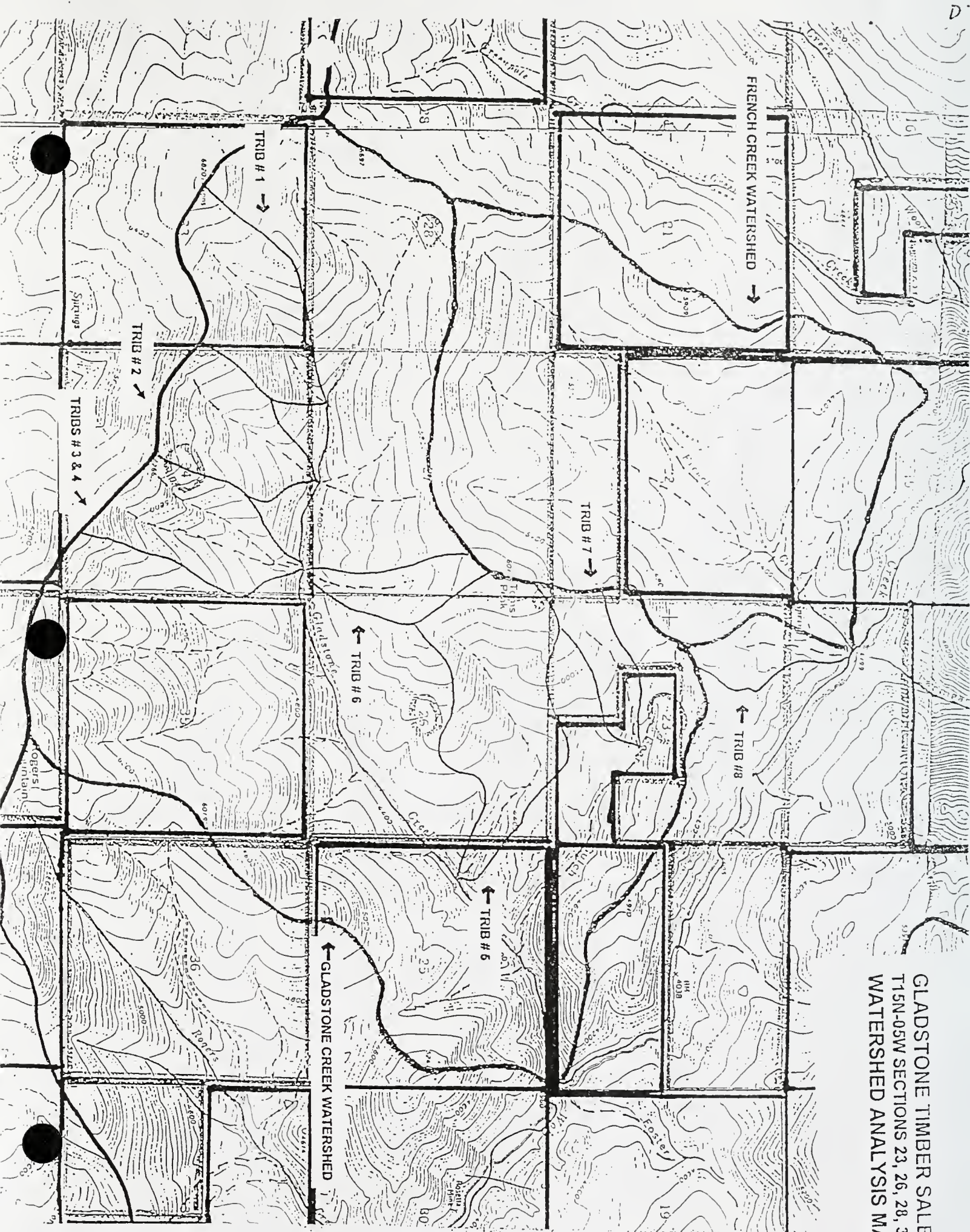
Erosion control measures aimed at stabilization of existing stream crossings and other improvements to the existing road system are expected to result in long term improvements to downstream water quality and improved protection of beneficial uses. There is little risk of adverse impacts to water quality and beneficial uses occurring as a result of the proposed action alternatives.

Cumulative Watershed Effects:

Results from the ECA analysis show that projected harvest levels are well below those levels normally associated with detrimental water yield increases and thus channel impacts. Expected water yield increases over current conditions resulting from the proposed sale area within French Creek are .2% with a 1.8% increase in ECA, while Gladstone Creek expected increases are 1% and 10%, respectively. It is unlikely that these levels of harvest would contribute to detectable increases in water yield or have any measurable influence on downstream channel conditions.

There is little risk of cumulative watershed impacts occurring from this sale proposal due to the following reasons: 1. The moderate level of existing development activity in each watershed. 2. The low level of additional overall crown removal and potential water yield increase that would be generated by the proposed actions. 3. Lack of existing channel impacts that can be attributed to silvicultural activities. 4. Existing cumulative watershed impacts appear to be limited to sedimentation resulting from poor road location, design and conditions and low probability natural runoff events. 5. The proposed improvements to the existing road system will benefit long term water quality and watershed conditions in the Gladstone Creek watershed.

GLADSTONE TIMBER SALE
T15N-05W SECTIONS 23, 26, 28, 34
WATERSHED ANALYSIS MAP



TO: D.J. Bakken, Forester, Helena Unit

FROM: George Mathieus, Forest Hydrologist, Forest Management Bureau

SUBJECT: Gladstone Timber Sale

DATE: July 9, 1998

D.J.:

The following table list the surface water domestic uses downstream of the sale area. I do not anticipate any impacts to these beneficial uses.

GLADSTONE CREEK TIMBER SALE Summary of Sensitive Beneficial Uses			
Legal	Water Right	Stream	Owner
T15N-R5W Sec 22, NENENE	41QJ-P-004301-00	French Creek	Cecil & Laura Curry, Bob Stainsby
T15N-R5W Sec 24, SESESE	41QJ-P-022432-00	Gladstone Creek	Bill Smith, Ron & Sara Carrell
T15N-R5W Sec 25, NENWNE	41QJ-Y-092702-00	Gladstone Creek	Brian Rooney
T15N-R4W Sec 30, NWNWNW	41QJ-W-103177-00	Wolf Creek	William Wendling

June 29, 1998

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TO: GARY WILLIAMS, Silviculturist, Central Land Office
D.J. BAKKEN, Lead Forester, Helena Unit
BILL SCHULTZ, Supervisor, State Land MGT. Section
GEORGE MATHIEUS, Hydrologist

FROM: JEFFRY COLLINS, Soil Scientist

SUBJECT: GLADSTONE TIMBER SALE, Draft Soils Input
Sections 23,26,28 and 34, T15N, R5W

EXISTING ENVIRONMENT Geology & terrain

The sale area is located on moderate to steep slopes with shallow to deep soils weathering from varied bedrocks of primarily limestone, argillites and volcanics (see attached geology map). The purple argillites and siltstones of Spokane formation are well fractured and easy to rip where bedrock is encountered at shallow depth. These rocks make excellent road construction material. Some igneous rocks are uplifted in a band on the northeast corner of section 34 forming some abrupt slopes above Gladstone Creek

There are no especially unusual or unique geologic features in the proposed harvest area. Slopes are generally stable and only a few very localized areas of slope instability were observed within the project area on section 27 and 28 which can be avoided or mitigated for thru project design. Historic avalanche chutes on the North slopes in the headwaters of Gladstone have lead to some past debris flows that are currently stable.

Primary soils within proposed harvest units of sections 23 and 26 are a complex of Mocmont/Tolex (unit 84F) on 25-60% slopes and a dry map unit phase 63F. Tolex channelly loams occur on convex slopes and ridges and are shallow (<20") with thin clayey subsoils just over the fractured bedrock. Rock outcrops occur on about 10-25% of the soil unit and can limit skid trail location and equipment operations. Tolex soils are very droughty and generally low fertility. Primary concern on both soils is maintaining soil depth and avoiding displacement of the shallow soils which can be mitigated by limiting ground based skidding to slope less than 45%. Erosion can be controlled by installing adequate drainage and grass seeding of main trails where needed. Leaving slash can provide shade to enhance survival of seedlings thru droughty periods.

Soils in section 34 (proposed units 4,5,6 and access road to unit 3) are Trapps-Warnecke channelly loams (984F) forming in limestone on forested mountain sideslopes of 25-60%. Trapps soils are deeper very channelly clay loams on concave slopes and swales. Trapps soils are sensitive to rutting on and displacement if operated on when wet. Slopes less than 40% are well suited to tractor operations if skid trails are planned. Cable harvest is required on steeper slopes to avoid severe erosion.

Soils within proposed harvest units 3,5 are (963F) Tolex/Rock outcrop complex on 30-60% slopes. Rock outcrops occur on up to 55% of this unit. Rock at shallow depth limits road construction and may require ripping.) These are low to moderate productivity soils that are limited by soil depth and droughty site conditions. Primary soil concern is limiting displacement of the shallow surface soils during harvesting and slash disposal. These sites have a longer season of use.

Soils dry out rapidly in most proposed harvest units and allow a long season of use. Harvest operations and road use will be limited to dry, frozen or snow covered conditions. Erosion will be controlled with standard drainage in skid trails where needed. Soils within harvest unit 13 are a complex of Tolex/Mocmont soil with rock outcrops on 25-50% of the site. Slopes are

ENVIRONMENTAL EFFECTS & MITIGATION MEASURES

The No-action alternative would have no direct soil effects within harvest units, yet erosion on roads and associated sedimentation would continue. Noxious weeds would spread along roads and into susceptible habitat types.

Under all action alternatives soil impacts would be controlled with mitigation measures including limiting the slope range of tractor operations, limiting season of use, and minimizing ground disturbance to levels needed for silvicultural prescriptions.

I do not expect any significant soil impacts with the proposed harvest based on the harvest unit locations and implementation of the following mitigation measures and site specific recommendations. Road drainage would be improved and road reconstruction and new construction would be completed to comply with BMP's.

GENERAL HARVEST MITIGATION MEASURES

- * Limit equipment operations to periods when soils are relatively dry, (less than 20%) frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up. Some moisture conditions are accepted on harvest units where tractors remain on designated trails and timber will be winched to trails.

- * The logger and sale administrator will agree to a general skidding plan on tractor units prior to equipment operations. Designated skid trails will be required on moderate slopes in units of attached map. Tractor skidding will be limited to 45% or less slopes on all other sites.

- * Mark and maintain ERZ's Equipment restriction zones on localized moist sites, draws and short steep slopes within harvest units as noted in site specific notes.

D11

* Slash Disposal- Limit scarification to 30-40% of units where regeneration desired. No tractor piling on wet sites or slopes over 35%. Retain 10-15 tons/acre large woody debris for nutrient cycling and longterm productivity. On the boulder sites with lower BA retain large woody debris as feasible since it may not be possible to retain 10tons/acre. Consider lop and scatter or jackpot burning on steeper slopes.

Noxious Weed Management

Noxious weeds occurrences are few within the project area. Localized infestations of Knapweed and thistle occur on private R/W along the Gladstone creek access road, mainly in the lower, westerly portion of the drainage. Spot occurrences of knapweed also occur in Section 23.

As an integrated weed management approach (required in HB 395) DNRC considered a combination of the following measures to be most effective; preventative measures; herbicide control of spot weed infestations; and prompt revegetation of roads and landings to limit the possible spread of noxious weeds into the project area. DNRC will coordinate weed control efforts with landowners along the right of way.

* All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on site.

* All newly disturbed soils on road cuts and fills will be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

* Where herbicide treatments are required by the forest officer, herbicide must be applied under the supervision of a licensed applicator following label directions in accordance with Department of Agriculture regulations, applicable laws and rules and regulations of the local weed board.

To: D.J. Bakken

From: Patrick Rennie

Subject: Gladstone Creek Timber Sale

D.J.:

The potential for cultural resources to exist in the areas of expected disturbance of the above referenced timber sale appears to be sufficiently low that I am not recommending any additional archaeological investigative work.



*Montana Fish,
Wildlife & Parks*

D13

August 20, 1997

P.O. Box 291
Fairfield, MT 59436
(406)467-2488

D.J. Bakken
Forester, Dept. of Natural Resources & Conservation
8001 North Montana Avenue
Helena, MT 59602

Mr. Bakken:

The following are my comments addressing the timber harvest actions in the Gladstone Creek area near Wolf Creek.

One of the primary wildlife concerns in this area is habitat security. Security as it relates to hunting season survival of bull elk is all but nonexistent. Any additional timber removal and associated roads will further degrade these minimal security levels.

Another area of concern is weed establishment. Weeds are well established in the Wolf Creek area and any new germination site associated with soil disturbance is a point of concern. Planned weed monitoring and control after all harvest activities should be part of any logging agreement.

In light of these concerns, very little support can be given to this cutting proposal or the associated road construction. If habitat security concerns are not paramount and logging is conducted, that alternative associated with the least amount of road construction should take priority.

Sincerely,

Quentin Kujala
wildlife biologist



Montana Fish, Wildlife & Parks

September 8, 1997

P.O. Box 291
Fairfield, MT 59436
(406)467-2488

D.J. Bakken
Forester, Dept. of Natural Resources & Conservation
8001 North Montana Avenue
Helena, MT 59602

Mr. Bakken:

Your letter responding to my initial comments concerning timber harvest in the Gladstone Creek area illustrates to me a difference in scale when you and I consider this timber harvest proposal. I will not argue your comments on amounts and types of timber cover present in the Gladstone and French Creek areas. Considering only this area and the specific sites involved, there are no doubt timber/terrain conditions capable of supporting logging. These were not my points or arguments.

As a whole, hunting district 423 (to include the Gladstone Creek and French Creek areas) provides very little observed hunting season survival of bull elk in a herd currently numbering approximately 350 animals. This low survival is related to hunter efficiency enhanced by habitat deficiencies brought about by high access levels and low security resulting from roads and cutting units associated with subdivision and/or logging efforts in this area. This proposed timber sale resulting in additional roads and open areas, no matter how well justified based on silvicultural characteristics and prescriptions, cannot be supported by management concerns applied to elk in all of hunting district 423.

Even though the bulk of my comments have been directed towards elk, I would at this time restate my concerns over additional noxious weed potential associated with any new ground breaking.

While my concerns are not related to just the Gladstone and French Creek areas, I am willing to tour the specific site and further discuss these points (and others I suppose). As you've placed the ball in my court, I will try to contact you and set a date.

Sincerely,

Quentin Kujala
wildlife biologist



Montana Fish, Wildlife & Parks

August 28, 1998

P.O. Box 291
Fairfield, MT 59436
(406) 467-2488

Mr. D.J. Bakken, Forester
Department of Natural Resources and Conservation
Central Land Office
8001 North Montana Avenue
Helena, MT 59602

Mr. Bakken:

In response to your letter dated 6/30/98 concerning the Gladstone Creek proposals in hunting district 423, please consider my comments better late than never. If they are too late for use in the E.A., then perhaps they can be of value for future management actions.

Your condensation of my comments relative to bull elk survival in hunting district 423 were well-worded. As to actual numbers of elk/bull elk observed, please note the following table.

<u>YEAR</u>	<u>TOTAL ELK OBSERVED</u>	<u>BULL ELK OBSERVED</u>
1996	301	10 spikes
1997	357	4 spikes, 1 brow-tined bull
1998	346	no bulls observed

Survey conditions in 1998 did not lend themselves to elk classification from the air. Bulls were very likely present but unobserved. You'll note that percent bulls is low as is bull age structure. Clearly, bull elk survival during the hunting season is low in hunting district 423. Bull elk population parameters comparable to these typically persist in areas lacking large blocks of effective security cover. Roads (logging and otherwise, closed to vehicles or not) and timber harvests have, to date, significantly eroded the finite amounts of bull elk security cover throughout hunting district 423.

Thank you for the opportunity to provide input into the E.A. process. Please feel free to call or write with any questions or comments.

Sincerely,

Quentin Kujala
wildlife biologist

GLADSTONE CREEK TIMBER SALE MARKING PLAN

Unit Boundaries for Units 1,3,4,5,6, 7 & 8

Blue "X" and stump spot facing into unit and paint unit # on a tree at edge of clearing limit as you enter unit for trucker i.d.

Road Clearing Limits

Yellow spots 45° into corridor on top and bottom, 15' above and below line on slopes up to 40%, or as per 6-Rivers table or engineering diagram elsewhere

ERZ & SMZ

Orange horizontal ring around tree at breast height, and stump mark

Leave Trees in Units 1,3,4,5,6,7 & 8

Blue vertical stripe from stump to breast height on 3 or more sides of stem

Cut Trees in Unit 2

Blue spot at breast height and a stump spot, facing the road, i.e. downhill side on trees above road, uphill side on trees below road

Units 1, 7 & 8 (113, 11 & 10 acres respectively)

Current stands are irregular uneven aged stands of Ponderosa Pine and Douglas-fir with patchy irregular areas of D.F. or PP understory on tractor operable terrain. Most of the trees 8" dbh or less are submerchantable due to taper. In the 9" - 19" size classes, mark leave trees on a 30' - 40' average spacing. Favor Ponderosa Pine over Douglas-fir. Do not mark only large trees, rather, spread trees proportionally across this diameter range as they occur. Select trees primarily for good timber form characteristics, though obvious wildlife use trees may also be left.

For trees 20" dbh and larger, mark only specific wildlife trees, eg. rotten face, cavity nested, dead or broken top, snags etc. These will probably amount to about 1/4 of the trees 20"+.

Due to instand variability, this prescription will have the varying effect of I.T.S. and shelterwood systems, yielding estimate harvest of 2,728 tons net.

Units 3,4, 5 & 6 (26, 20, 5 & 3 acre respectively)

Current stands are single storied lodgepole with variable mixes of Douglas-fir in parts of the stands. Units 3 & 5 are to be cable yarded, Units 4 and 6 are tractor ground. Contract will specify cutting all LP (except thickets of submerch that can be left undamaged). Undamaged thickets of D.F. are rare, but may also be retained, if undamaged. Trees 7" dbh and smaller are mostly submerchantable.

In the 8" - maximum size classes of Douglas-fir, mark approximately 50% of the D.F. to leave. Existing D.F. spacing is non-uniform so no average spacing can be calculated. End results will vary from shelterwood to seed tree to clearcut and clearcut with reserve patches. Select leave D.F. based on timber and wildlife characteristics. No ponderosa showed up in these unit cruises, but PP can be marked to leave if encountered.

Unit 2 (Approximately 15-16 acres)

This unit is SMZ and adjacent stands along the existing road in Gladstone Creek in Section 26. No equipment operations shall be allowed below the road, and there are very few areas where slopes under 45% would allow for equipment operations above the road.

Where potential decking sites exist above the road, and for a few hundred feet either side of those locations, mark-to-cut using group selection methods. Mark groups of 1/20 - 1/4 acre that can be ground lead or skidded to road and then to landing. Be sure to retain 50% or 10 trees/each 100' segment of SMZ. Individual trees showing roadside vehicle damage may be marked to cut also. Estimated harvest has not been determined.

Cruising

A randomly located variable plot cruise of cut and leave trees in Units 1, & 3 - 8 has already been completed to +/- 15.8% with 90% confidence. Tariff estimates with 77 tariff tree measurements are established, so no additional tree heights will be needed.

In Units 1, 7 & 8, cruise on a 1:30 basis recording spp, dbh and def. Each marker to keep their own tally and final tally total.

In Units 3, 4, 5 & 6, cruise on a 1:10 basis, recording spp, dbh, def. and final tally total.

In Unit 2, the only mark-to-cut unit, cruise also at a 1:10, recording spp, dbh, def. and final tally.

Existing stand data and proposed treatments are attached for reference.

Input file to INVTRY is C:\PGMS\INV\PROJECT1\PP26.dft4

the sec. 26 part of unit 1
= 104 ac
cut & leave data

Report: TPA - Trees per Acre

Both ALIVE and DEAD

DBH	SPECIES					while cruising est. of (no DF leave in leave plots)		
	PP	DF	DD	TOTAL	%SE	PP	dry	total
5	73.3	0.0	0.0	73.3	61.46	29.3	0	29.3
6	40.7	0.0	10.2	50.9	61.46	0	10.2	10.2
7	15.0	0.0	0.0	15.0	66.67	0	0	0
8	11.5	0.0	0.0	11.5	66.67	0	0	0
9	22.6	13.6	4.5	40.7	34.94	4.5	4.5	9
10	0.0	3.7	0.0	3.7	100.00	0	0	0
11	9.1	3.0	0.0	12.1	55.28	0	0	0
12	7.6	7.6	0.0	15.3	44.44	5.1	0	5.1
13	17.4	0.0	2.2	19.5	34.94	2.2	2.2	4.4
14	1.9	0.0	0.0	1.9	100.00	0	0	0
15	4.9	0.0	0.0	4.9	50.92	1.6	0	1.6
16	2.9	0.0	0.0	2.9	66.67	2.9	0	2.9
17	2.5	0.0	0.0	2.5	66.67	1.3	0	1.3
18	1.0	0.0	0.0	1.0	100.00	1.0	0	1.0
19	1.8	0.0	0.0	1.8	66.67	0.9	0	0.9
20	0.8	0.0	0.0	0.8	100.00	0	0	0
21	1.5	0.0	0.0	1.5	100.00	0.8	0	0.8
22	0.7	0.0	0.0	0.7	100.00	0.7	0	0.7
23	0.0	0.0	0.6	0.6	100.00	0	0.6	0.6
24	0.0	0.0	0.6	0.6	100.00	0	0.6	0.6
TOTAL	215.3	27.9	17.5	260.73		50.3	17.5	67.8
%SE	43.52	44.00	59.76		34.65			

8" & less
cut out / if
logging done
intercepted
a landing

leave 40-50%
of trees
favoring PP
over DF
mostly by
timber form
or obvious wils.
reasons

20" +
leave only
specific wils.
trees a unique
large specimens
w/4 of trees 20"

harvest plan, most of the 8" & less are submerch. due to top, so will be left, except for logging damaged. In the 9"-19" classes, mark ~45% of trees to leave spread across dia. range, but favoring PP over DF. Left at uniform spacing the 9"-19" classes will be at 30'-40' spacing arg. In the 20" & larger sizes, leave approx 1/4 of the trees, most will be for w.l. reasons, but exceptional specimens may also be left. In the 9"-19" base selection mostly on timber form, though obvious wils. trees may also be left.

tractor skid, retain ~50% of slash, not over 10 T/ac, on site. Retention can be by any combination of log length a % of stems & tree length remainder, tree length all & return skid, partial limbing w/ top skidded attached. Retained slash shall be lopped to 18'-24' depth

1/2 of slash on cut trees = 3.35 T/ac, plus large PP limbs, fines & a higher % of call (41% here vs 28% here, 23) should yield 9-10 T/ac

anticipate harvest of 1713.6 Tons tractor
(58188 cut net at 41% def)

Input file to INVTY is C:\PGMS\INV\PROJECT1\PP26.dt4

Report: BA - Basal Area per Acre

Both ALIVE and DEAD

while
cruising
est. of
leave (none in DF)

except if
damaged
leave all
28 sq ft

leave
40-50%
of the
size
of PP
over DF
for ~34.2

le
~1/4
tree
n. on
very good
~3.5 sq ft

65.7 ft²
(37.7 sq ft
79")

Flamulated
prefer 35-80
we would have
38-66 ft²

DBH	SPECIES					
	PP	DF	DD	TOTAL	%SE	
5	10.0	0.0	0.0	10.0	61.46	
6	8.0	0.0	2.0	10.0	61.46	
7	4.0	0.0	0.0	4.0	66.67	
8	4.0	0.0	0.0	4.0	66.67	
9	10.0	6.0	2.0	18.0	34.94	
10	0.0	2.0	0.0	2.0	100.00	
11	6.0	2.0	0.0	8.0	55.28	
12	6.0	6.0	0.0	12.0	44.44	
13	16.0	0.0	2.0	18.0	34.94	
14	2.0	0.0	0.0	2.0	100.00	
15	6.0	0.0	0.0	6.0	50.92	
16	4.0	0.0	0.0	4.0	66.67	
17	4.0	0.0	0.0	4.0	66.67	
19	2.0	0.0	0.0	2.0	100.00	
20	4.0	0.0	0.0	4.0	66.67	
21	2.0	0.0	0.0	2.0	100.00	
22	4.0	0.0	0.0	4.0	100.00	
23	2.0	0.0	0.0	2.0	100.00	
24	0.0	0.0	2.0	2.0	100.00	
TOTAL				94.0	16.0	8.0
				117.96		
%SE				20.06	40.83	40.82
					16.65	

PP	dry	total
4	0	4
0	2	2
0	0	0
2	2	4
0	0	0
0	0	0
4	0	4
2	2	4
0	0	0
2	0	2
4	0	4
2	0	2
2	0	2
2	0	2
2	0	2
0	2	2
28	8	36

leave
all

leave
40-50%

leave
~1/4
most 1/4
area good
specimen

Input file to INVTRY is C:\PGMS\INV\PROJECT1\PP26.dat4

Report: NET SV6 - Net volume Board Ft to 6 in. Top Tract Totals

Both ALIVE and DEAD

values are in Thousands

DBH	SPECIES			TOTAL	%SE
	PP	DF	DD		
8	3.3	0.0	0.0	3.3	100.00
9	25.3	6.7	0.0	32.1	59.63
11	22.2	13.4	0.0	35.5	67.10
12	19.1	16.2	0.0	35.3	45.25
13	51.9	0.0	1.2	53.1	47.15
14	17.8	0.0	0.0	17.8	100.00
15	35.9	0.0	0.0	35.9	51.07
16	32.6	0.0	0.0	32.6	68.74
17	25.3	0.0	0.0	25.3	66.97
19	4.5	0.0	0.0	4.5	100.00
20	14.9	0.0	0.0	14.9	89.24
21	10.8	0.0	0.0	10.8	100.00
22	28.1	0.0	0.0	28.1	100.00
23	6.3	0.0	0.0	6.3	100.00
TOTAL	298.0	36.3	1.2	335.60	
%SE	22.13	60.15	100.00		22.97

est,
leave

3.3M

all, mostly submerch

122.4

leave 40-50%
mostly timber for
some w.l.
favor ppore DF.

~ 15 M

leave ~ 1/4 of trees
mostly for w.l.
or very good specimen

140.7M

while cruising, I est. leave vol. at 104.15M (74% of above)

cut ~ 58% of vol.

Input file to INVTRY is C:\PGMS\INV\PROJECT1\PP23.dt4

Report: TPA - Trees per Acre

Both ALIVE and DEAD

the sec. 23 part of unit 1
8 units 7 & 8 = 30 ac
Cut & Leave data

DBH	SPECIES					while cruising est. of leave			dry	
	PP	DF	DD	TOTAL	%SE	PP	DF			
6	30.6	10.2	0.0	40.7	58.49	10.2	10.2	0		
7	22.5	7.5	0.0	29.9	45.88	15	7.5	0		
8	28.6	0.0	5.7	34.4	68.82	11.5	0	5.7		
9	31.7	18.1	0.0	49.8	36.06	22.6	4.5	0		
10	14.7	18.3	0.0	33.0	37.72	0	3.7	0		
11	15.2	3.0	0.0	18.2	35.04	6.1	0	0		
12	0.0	5.1	0.0	5.1	68.82	0	0	0		
13	10.9	4.3	0.0	15.2	37.51	4.3	2.2	0		
14	7.5	1.9	0.0	9.4	49.20	7.5	0	0		
15	3.3	0.0	0.0	3.3	68.82	0	0	0		
16	2.9	0.0	0.0	2.9	68.82	1.4	0	0		
17	1.3	0.0	0.0	1.3	100.00	0	0	0		
18	3.4	0.0	0.0	3.4	54.61	1.1	0	0		
19	3.0	2.0	0.0	5.1	49.20	1.0	0	0		
20	0.9	0.0	0.0	0.9	100.00	0.9	0	0		
21	0.8	0.0	0.0	0.8	100.00	0	0	0		
23	0.7	0.0	0.0	0.7	100.00	0	0	0		
25	1.2	0.6	0.0	1.8	72.95	0	0	0		
27	0.5	0.0	0.0	0.5	100.00	0	0	0		
28	0.0	0.5	0.0	0.5	100.00	0	0	0		
30	0.4	0.0	0.0	0.4	100.00	0.4	0	0		
31	0.0	0.0	0.4	0.4	100.00	0	0	0.4		
TOTAL	179.9	71.5	6.1	257.50		82	28	6.1	116.2	
%SE	24.71	35.82	93.64		20.81					

harvest plan, most of the trees 8" & less are submerch. due to taper, so will be left, except if logging damaged. In the 9"-19" classes, mark ~ 1/3 of trees to leave spread across this dia. range, but favoring P.P. over D.F. Because there are more trees 9"-13" than 14"-19", on a tree tallying basis, you will have more numbers of trees in the lower end of the 9"-19" range. In the 9"-19" range, leave trees, if uniformly spaced, will be at 30'-40' spacing average. In the 20" and larger sizes, leave only those trees with specific w.l. values such as cavity nests, broken or spike tops etc. In the 9"-19" range, base leave trees selection on timber form characteristics mostly, though obvious w.l. used trees may also be left.

tractors skid, retain ~ 50% of slash ^{not over 10' in} on site, retention can be by any combination of log length a % of stems & tree length remainder, tree length all & return skid, partial limbing with tops skidded attached. Retained slash shall be lopped to 18"-24" depth. 1/2 of the slash on cut trees ~ 513 tons, plus large PP limbs & fines & occasional cull trees killed should yield ~ 10 T/acre.

anticipated harvest of 1014.4 TONS tractor

Input file to INVTRY is C:\PGMS\INV\PROJECT1\PP23.dt4

Report: BA - Basal Area per Acre

Both ALIVE and DEAD

while
existing
est. of
leave

DBH	SPECIES					P	D	dry	
	PP	DF	DD	TOTAL	%SE				
6	6.0	2.0	0.0	8.0	58.49	2	2	0	10 BA
7	6.0	2.0	0.0	8.0	45.88	4	2	0	
8	10.0	0.0	2.0	12.0	68.82	4	0	2	13 BA
9	14.0	8.0	0.0	22.0	36.06	10	2	0	6 BA
10	8.0	10.0	0.0	18.0	37.72	0	2	0	
11	10.0	2.0	0.0	12.0	35.04	4	0	0	
12	0.0	4.0	0.0	4.0	68.82	0	0	0	6 BA
13	10.0	4.0	0.0	14.0	37.51	4	2	0	
14	8.0	2.0	0.0	10.0	49.20	8	0	0	8 BA
15	4.0	0.0	0.0	4.0	68.82	0	0	0	
16	4.0	0.0	0.0	4.0	68.82	2	0	0	2 BA
17	2.0	0.0	0.0	2.0	100.00	0	0	0	
18	6.0	0.0	0.0	6.0	54.61	2	0	0	4 BA
19	6.0	4.0	0.0	10.0	49.20	2	0	0	2 BA
20	2.0	0.0	0.0	2.0	100.00	2	0	0	
21	2.0	0.0	0.0	2.0	100.00	0	0	0	6
23	2.0	0.0	0.0	2.0	100.00	0	0	0	0
25	4.0	2.0	0.0	6.0	72.95	0	0	0	0
27	2.0	0.0	0.0	2.0	100.00	0	0	0	0
28	0.0	2.0	0.0	2.0	100.00	0	0	0	
30	2.0	0.0	0.0	2.0	100.00	2	0	0	4 BA
31	0.0	0.0	2.0	2.0	100.00	0	0	2	
TOTAL	108.0	42.0	4.0	153.97		46	10	4	60
%SE	14.98	29.70	68.82		11.96				

Flammulated
prefer
35-80 ft
we would have
39-67 ft

Input file to INVTRY is C:\PGMS\INV\PROJECT1\PP23.dt4

Report: NET SV6 - Net volume Board Ft to 6 in. Top -- Tract Totals

Both ALIVE and DEAD

Values are in Thousands

DBH	SPECIES				
	PP	DF	DD	TOTAL	%SE
8	3.7	0.0	0.0	3.7	100.00
9	7.8	8.0	0.0	15.7	42.57
10	11.7	13.8	0.0	25.5	40.11
11	13.4	1.8	0.0	15.2	41.88
12	0.0	5.1	0.0	5.1	70.53
13	18.3	2.7	0.0	20.9	45.29
14	13.3	4.2	0.0	17.5	66.53
15	8.4	0.0	0.0	8.4	69.33
16	9.0	0.0	0.0	9.0	69.48
17	4.8	0.0	0.0	4.8	100.00
18	16.2	0.0	0.0	16.2	55.61
19	14.9	8.9	0.0	23.8	48.19
20	6.1	0.0	0.0	6.1	100.00
21	3.5	0.0	0.0	3.5	100.00
23	4.8	0.0	0.0	4.8	100.00
25	13.1	5.6	0.0	18.7	83.68
27	5.4	0.0	0.0	5.4	100.00
28	0.0	5.3	0.0	5.3	100.00
TOTAL	154.3	55.4	0.0	209.69	
%SE	12.73	29.55	0.00		12.12

est.
leave

3.7

all, mostly sat more h

54.1M

~ 1/3, favor PP over DF
across this range,
proportion of tree count based
to existing logs

~ 11.5M

only specific
w. l. trees

69.3 MBF

while cruising, I est. leave vol. at 52.75M (76% of above)
because I was leaving a higher than expected
occurrence of large defective w. l. trees

cut ~ 67% of vol.

Input file to INVTRY is C:\PGMS\INV\PROJECT1\LP2834.dtf

units 3, 4, 5 & 6, = 54.
Cut & Leave data

Report: TPA - Trees per Acre

Both ALIVE and DEAD

while
cruising
est. of
leave
all
DF

50%
of DF
≥ 8"

working
limit

DBH	SPECIES				DF	
	DF	LP	TOTAL	%SE		
6	10.2	30.6	40.7	44.32	all 10.2	no cutting except logging damage DF, & total LP all submerch. LP individuals
7	22.5	59.9	82.3	28.13	7.5	
8	5.7	80.2	85.9	25.82	0	2.6
9	22.6	90.5	113.2	19.12	13.6	11.3
10	7.3	47.7	55.0	25.82	3.7	3.6
11	15.2	24.2	39.4	35.37	9.1	7.6
13	0.0	2.2	2.2	100.00	0	0
14	1.9	0.0	1.9	100.00	all 1.9	.9
15	1.6	0.0	1.6	100.00	0	.8
20	0.9	0.0	0.9	100.00	0	.5
TOTAL	87.9	335.3	423.17		45.9	27.5 ≥ 8"
					(28.2 ≥ 8")	
%SE	28.83	13.63		9.28		

harvest plan is to cut all LP & to seed tree harvest DF. In reality, contract will allow thickets of LP & DF submerch, that are not logging damaged, to remain standing. There is probably no saw log vol. unless 8" dbh.

Mark in the 8" + size classes, spread leave trees across the full range of doug.-fir diameters, marking approx. 1/2 of the D.F. to leave. Existing D.F. spacing is non-uniform, so strict spacing guidelines are irrelevant.

Select DF leave trees based on timber and wildlife characteristics.

Cable) Hand fell, lop every 4th Lodgepole top for log length yarding, tree length yard the other 3/4 of the LP & all D.F., process on road, pile slash below road in burnable piles.

Tractor) Retain 10-12 ton/ac slash on site, either by log length skidding & piling or tree length w/ 1/4 lop, or reskid slash.

1/4 of the LP slash ≈ 9.4 Tons/ac 3"-6", with misc. fines ~ 10-12 ton/ac

anticipated harvest of 3784 TONS < 2172 T line ground
1612 T tractor

(128489 cu.ft.)
@ 7% def net

Input file to INVTRY is C:\PGMS\INV\PROJECT1\LP2834.d4

Report: BA - Basal Area per Acre

Both ALIVE and DEAD

DBH	SPECIES			
	DF	LP	TOTAL	%SE
6	2.0	6.0	8.0	44.32
7	6.0	16.0	22.0	28.13
8	2.0	28.0	30.0	25.82
9	10.0	40.0	50.0	19.12
10	4.0	26.0	30.0	25.82
11	10.0	16.0	26.0	35.37
13	0.0	2.0	2.0	100.00
14	2.0	0.0	2.0	100.00
15	2.0	0.0	2.0	100.00
20	2.0	0.0	2.0	100.00
TOTAL	40.0	134.0	173.96	
%SE	25.00	14.14		10.26

50%
DF
BA
≥ 8"

1
5
2
5
0
1
1
1

16% BA in DF ≥ 8"
after harvest

Input file to INVTRY is C:\PGMS\INV\PROJECT1\LP2834.dt4

Report: NET SV6 - Net volume Board Ft to 6 in Top -- Tract Totals

Both ALIVE and DEAD

Values are in Thousands

DBH	SPECIES		TOTAL	%SE	50% DF 7.8"
	DF	LP			
8	3.9	77.0	80.9	26.94	1.95
9	29.4	143.4	172.8	20.13	14.70
10	13.8	132.0	145.8	27.63	16.9
11	41.8	98.2	140.0	36.69	20.9
13	0.0	11.8	11.8	100.00	0
14	9.9	0.0	9.9	100.00	4.95
15	10.4	0.0	10.4	100.00	5.2
20	10.9	0.0	10.9	100.00	5.45
TOTAL	120.2	462.4	582.56		70.05 MBF
%SE	30.27	20.15		16.81	

while cruising, I estimated a leave vol. of 59.72 M, (85% of live)
this lesser amount due to the disproportionate frequency of
large defect ridden wild life trees in the 50% of DF being
left.
cut ~ 88% of vol.

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. ²³26 Twp. 15N Rge 5W

Acres: ~110ac Slope: 10-45, 35 avg Unit # 1
Aspect: NE Elevation: 4400-4800 Stand(s) part of sec. 26 #6
sec. 26 #11A
sec. 23 #17
Habitat Type: Psme/Carn, Psme/Cage, Psme/syal, Psme/leid, Pipo/leid, Pipo/Agsp
(listed from most common to least)

Description of Existing Stand:

stand 26-15-5-6 = P9MP, 140ac overall,
26-15-5-11A = NC, P9MP, 30ac overall,
23-15-5-17 = P9M, 16ac overall,

Age: Dominant PP & DF
Codominant PP & DF
Understory DF & PP

Height: ~65
Growth: slow
I & D: needle cast, western pine beetle, Ips

Constraints:

Groundskidding at 45% or less
5MZ & ERZ for dunnies inside unit

Silvicultural Objectives - Target Stand:

Structure: uneven aged, multi-storied, irregular
Species: PP mostly w/ some DF
Stocking: 35 ft² BA to 50 ft² large component in large trees

Treatment Alternatives:

- ① balanced uneven aged system w/ group or ITS, thinning submerch, harvesting mostly layers
- ★ ② irregular group and ITS, harvest small saw log & med. saw log, retain some good form trees and wildlife snags, broke tops etc., retain patches of submerch in existing overstocked conditions
- ③ even aged system

Site Preparation/Hazard Reduction:

minimize scerification to 30-40% or less, partial tree length retaining or return
skidding 10-15 T/ac of slash for nutrients & erosion

TSI:

fell top logging damage trees only, retain thicket of submerch. where possible, leave long butts and cull stems that are killed on site

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 26 Twp. 15N Rge. 5W
Acres: ~15-16 Slope: 40%+ Unit # 2
Aspect: SE Elevation: 4400-4600 stand part of sec. 26 #10
Habitat Type: P. sme/cara, P. sme/phma w/ rapid transitional bands as slope drops to creek at bottom of SMZ.

Description of Existing Stand: stand 26-15-5-10, DQUW, 28 ac overall,

Age: Dominant DF & PP, some Co
Codominant DF & PP
Understory DF & PP

Height: 65-70
Growth: slow in rocky areas, some vigorous closer to cr.
I & D: needle cast

Constraints:
SMZ low, skidding on 45% class, Fire hazard concerns along road

Silvicultural Objectives - Target Stand:

Structure: uneven aged
Species: PP & DF
Stocking: 50%+ of existing (SMZ induced)

Treatment Alternatives:

- ① Group sel. overall, possible to overcut some segments of SMZ
- ★ ② mixture of Group Sel. & ITS inside SMZ
- ③ clearcut above SMZ, no cut in SMZ

Site Preparation/Hazard Reduction:

minimal scarification, slope limits equip to existing Rd. & maybe a few flat areas adj. above Rd. rest of harvest must be within reach line distance. tree length 90% of slash due to fire hazard concerns along Rd.

TSI:

None

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 28 Twp. 15N Rge 5W
Acres: ~28 ac Slope: 45 - 65 %, avg 55 Unit # 3
Aspect: NE Elevation: 5040 - 5480 stand part of sec 28 # 2
Habitat Type: mostly Psump/caru

Description of Existing Stand: stand 28-15-5-2 = LPWW, 87 ac overall,

Age: Dominant LP & DF
Codominant LP
Understory patch, DF and stagnant LPB patches

Height: 55-65
Growth: slow, except for fringe closest to Cui
I & D: Ips

Constraints:
ground skidding only if less than 40%
SMZ at base of unit

Silvicultural Objectives - Target Stand:

Structure: multi-aged
Species: DF & LP
Stocking: regen harvest

Treatment Alternatives:

- ① cable yarding due to slope, uneven aged group selection or ITS, complicated by skidding method
- ② clear cut & cable yard
- ③ partial clear cut, some w/ reserves of unmerchant patches and DF seed trees retained where they exist, retain extra trees as required for SMZ at base of unit

Site Preparation/Hazard Reduction:
partial tree length, retain ~1/4 of slash for 10-15 ton/ac on site

TSI:

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 34 Twp. 15N Rge 5W
Acres: ~18 ac Slope: 15-45, 35% avg Unit # 4 (see also 5 & 6)
Aspect: NE Elevation: 4800-5120 stand part of sec. 34 #4
Habitat Type: Psme/phma & Psma/cara

Description of Existing Stand:

stand 34-15-5-4 = LPBW, overall on 38 ac, LPBW in
ac in unit 4

Age: Dominant LP9
Codominant LP8 & some D9
Understory trace DF

Height: 65
Growth: slow
I & D: none

Constraints:

smz in unit
visuals across from residence
skidding on slopes only under 40%

Silvicultural Objectives - Target Stand:

Structure: even age
Species: LP
Stocking: 200 TPA +

Treatment Alternatives:

- ① clear cut entire unit
- * ② cut all LP, retain ~~20~~ % of DF & seed tree where they exist
- ③ partial cut, risk blowdown of small LP stems

Site Preparation/Hazard Reduction:

partial tree length, retain ~10 TPA slash pile rest for burning

TSI:

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 34 Twp. 15N Rge 5W

Acres: ~6 ac Slope: 55-70, 60% avg. Unit # 5 (see also 4 & 6)

Aspect: NE Elevation: 4720-4880 stand part of sec. 34 #4

Habitat Type: mostly P. sme/p. hma

Description of Existing Stand:

stand 34-15-5-4 = LPBW overall on 36 ac, LPBW on
ac in unit 5,

Age: Dominant _____
Codominant _____
Understory _____

same as unit 4

Height: _____
Growth: _____
I & D: _____

Constraints:

skidding only on slopes less than 40%

Silvicultural Objectives - Target Stand:

Structure: _____
Species: _____
Stocking: _____

same as unit 4

Treatment Alternatives:

same as unit 4, except
partial cut further complicated by reg. to cable yard due to slope

Site Preparation/Hazard Reduction:

same as unit 4

TSI:

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 34 Twp. 15N Rge 5W
Acres: ~3 ac Slope: 15-45, 35% avg Unit # 6 (see also 4 & 5)
Aspect: NE Elevation: 4800 - 4920 stand part of sec. 34 # 4
Habitat Type: Psme/phma & Psme/caru

Description of Existing Stand: stand 34-15-5-4 = LP8W over 38 ac, LP9W on ac in unit 6

Age: Dominant _____
Codominant _____
Understory _____

Height: _____
Growth: _____
I & D: _____

same as unit 4

Constraints:
SMZ type I on east edge & type 3 on ephemeral in unit

Silvicultural Objectives - Target Stand:

Structure: _____
Species: _____
Stocking: _____

same as unit 4

Treatment Alternatives:

same as unit 4

Site Preparation/Hazard Reduction:

same as unit 4

TSI:

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 23 Twp. 15N Rge 5W

Acres: ~11 ac Slope: 25% Unit # 7

Aspect: NW Elevation: 4560-4760 stand sec 23 # 2

Habitat Type: Psme/carn, and Pipo/Ag sp mostly

Description of Existing Stand:

stand 23-15-5-2 = PPM, 15 ac overall

Age: Dominant P & D 9
Codominant P & D
Understory some P & D

Height: 65
Growth: slow
I & D: some Elytridemia

Constraints:

skidding 45% or less
adverse skidding a temp. work Rd
wind & throw

Silvicultural Objectives - Target Stand:

Structure: 2 aged or even aged w/ trace of older for structural diversity
Species: P & D
Stocking: 200+TPA overall 30-40 TPA at age structure

Treatment Alternatives:

- ① clearcut - would restock slowest of options & be even aged with wide age range
- ② seed tree - could yield even aged stand, w/ sparse old component, potential for wind throw
- ★ ③ shelter wood - but retain overstory for large component in stand, mix of P & D
- ④ classical uneven aged - existing age structure not conducive to this, but could lead this way in future if desired

Site Preparation/Hazard Reduction:

minimizes scarification
partial tree length

TSI:

fell logging damaged

CENTRAL LAND OFFICE
Silviculture Preparation
Field Analysis

Sec. 23 Twp. 15N Rge 5W

Acres: ~5 ac Slope: 15-45, 35% avg. Unit # 8

Aspect: N (NW-NE) Elevation: 4440 - 4600 stand(s) sec. 23 #4 & portion of 23 #5

Habitat Type: Psme/can & Psme/cage

Description of Existing Stand:

stand 23-15-5-4 = D9W, 13 ac overall,
23-15-5-5 = D9W, 34 ac overall

Age: Dominant P & D
Codominant D mostly
Understory D mostly

There is about 1 ac of large PP
at head of draw, remainder of unit
smaller sawlog size mixed P & D

Height: 55-70'
Growth: slow
I & D: possible rot rot in pocket along draw

Constraints:

ephemeral or type III stream in unit
mostly adverse skid
skidding 45% or less

Silvicultural Objectives - Target Stand:

Structure: 2 aged or unbalanced uneven aged
Species: D & P
Stocking: 200 TPA overall

Treatment Alternatives:

- * ① shelterwood - but retain overstory for structural diversity after regen phase
retain 30-50% of large PP in the unique 1 ac patch
- ② through a group selection method begin creation of multiple age
classes by harvesting small openings

Site Preparation/Hazard Reduction:

minimize scarification
partial tree length, or log length & re skid due to adverse skid on most of unit

ISI:

100 logging damaged

FINDING

Gladstone Creek Timber Sale
Sections 14, 23, 26, 28, and 34, T15N-R5W

INTRODUCTION

The Montana Department of Natural Resources has proposed a timber harvest in the Gladstone Creek drainage, located approximately six miles west of Wolf Creek. The proposed harvest would remove an estimated 500-850 MBF of timber from approximately 180-200 acres of forested school trust lands.

The State ownership consists of 5 contiguous parcels that are intermingled with private land and encompasses approximately 2413 acres. An estimated 2369 acres of the State land is forested.

Access to the State land is via an existing county road at the confluence of Wolf Creek and French Creek. A temporary road use agreement and an easement negotiated with two adjacent landowners provide access to additional parcels in Gladstone Creek.

These tracts are classified forest tracts, valued principally for their forest resources and are part of the land grant held by the State of Montana in trust for the support of the specific beneficiary, in this case sections 14, 23 and 26 for Common Schools, section 28 is State Reform School and Section 34 is for the Agricultural College (MSU).

DECISION TO BE MADE

I have reviewed the Environmental Assessment prepared for the Gladstone Creek timber sale specifically to:

- 1) Decide if an Environmental Assessment is the appropriate level of analysis or if an Environmental Impact Statement should be prepared.
- 2) Select an alternative to implement based on the information provided in the EA and a finding that an EIS is not necessary.

ALTERNATIVES UNDER CONSIDERATION

There were 5 alternatives considered in the EA. Only two remain selectable. One alternative, using an access route across private land from French Creek, was dropped from consideration early in the process due to a clear indication that an access agreement from all landowners could not be negotiated. Two alternatives, using an access route entirely in the Gladstone Creek drainage were considered throughout the process but cannot be selected because an acceptable road use agreement could not be negotiated with two of the landowners. The remaining two alternatives are reasonable and selectable.

No Action: Under this alternative, the timber harvest would not occur. Income from forest management activities would not be generated at this time.

Timber Harvest with State Road Access: Under this alternative, an estimated 700-850 MBF of timber would be harvested from approximately 200 acres. Eight treatment units are planned as follows:

Unit #	Acreage	Type of Harvest	Skidding Method	Residual Stand
1	110	Individual Tree or Group Select	Tractor skidding	Uneven aged
2	16	Individual Tree or Group Select	Winch to road	Uneven aged
3	28	Clearcut w/reserves and seed tree	Cable yarding	Even aged
4	20	Clearcut w/reserves and seed tree	Tractor skidding	Even aged
5	5	Clearcut w/reserves and seed tree	Cable yarding	Even aged
6	3	Clearcut w/reserves and seed tree	Tractor skidding	Even aged
7	11	Shelterwood	Tractor skidding	Even aged
8	5	Shelterwood	Tractor skidding	Even aged

An estimated 4.4 miles of new road would be constructed under this harvest proposal. Construction would begin on State land, from the French Creek road in Section 14. A bridge will be installed to cross the creek. The bridge will be gated and locked to prevent unauthorized use. An estimated 3.2 miles of new road would be constructed on State land to tie in with an existing road in the Gladstone Creek drainage. An additional 1.2 miles of road would be constructed in the Gladstone drainage to access harvest units.

ISSUES, CONCERNS AND PUBLIC COMMENT

Notices of the proposed harvest were published in the Helena Independent Record on July 30, August 3 and August 10, 1997. An initial proposal was mailed to special interest groups, interested individuals, specialists in DNRC, the Department of Fish, Wildlife and Parks (DFWP) and landowners in French and Gladstone Creek. The primary issues that resulted from the scoping effort include:

- 1) Right-of-way and Access Issues - Landowners in Gladstone and French Creek are concerned that road development associated with the proposed harvest will increase use by the public, create trespass problems and increase littering.
- 2) Bull Elk Survival - The DFWP is concerned the proposed timber harvest will reduce elk security in an area that already has low bull elk survival due to high access levels and low security resulting from subdivisions and/or previous logging efforts in the hunting district (423).
- 3) Weeds - There is concern the disturbance associated with the proposed harvest would create conditions favorable for the spread of noxious weeds.
- 4) Sensitive Species - There is concern the proposed sale would adversely affect sensitive species.

To address the concerns identified in the scoping effort, the following mitigations were incorporated in the harvest proposal.

- The new road construction between French and Gladstone Creeks will be closed by locked gate to restrict unauthorized use and access.
- Disturbed sites will be promptly seeded with grass, weed infestations will be monitored and treated until revegetation of disturbed sites is complete. A road use and weed control agreement between DNRC and private landowners has been established for portions of the existing road in Gladstone Creek.

- Large diameter trees will be marked to leave in appropriate stands.
- Older trees with broken tops and signs of rot will be marked to leave.
- Some dense overstocked stands will remain intact to maintain non-uniformity in the stand.

SELECTION OF THE ALTERNATIVE

After reviewing the EA, comments received on the proposal and input from resource specialists, I have decided to proceed with the harvest alternative with State road access. I have selected this alternative because I believe it can be implemented in a manner that is consistent with the long-term management of the tract while generating an estimated income of \$75,000.00 to \$100,000.00. The timber harvest will treat approximately 200 acres of forest land that is in an overstocked and unhealthy condition resulting from almost 100 years of fire suppression and inactive management. The proposed harvest will develop permanent access for DNRC to state holdings in the area allowing continued future management of the land. Access for the public would be restricted to foot traffic only, as currently exists.

I have rejected the No Action Alternative because the timber harvest can be conducted in a manner consistent with the management of the surrounding lands while producing trust revenue.

The alternatives requiring access across private lands in Gladstone Creek or French Creek are not selectable due to the inability to negotiate an easement with all necessary landowners.

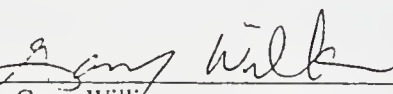
Finding

Based on my review of the information provided in the EA and the project file, I conclude that significant impacts would not occur as a result of implementing the timber harvest with State access. Therefore, an Environmental Impact Statement is not necessary. I base this decision on the following considerations:

- 1) There are not threatened or endangered species inhabiting the area. Although grizzly bears are occasionally reported in the vicinity, this area is outside of a recovery zone and has numerous houses that are occupied year-round thereby making a grizzly bear cohabitation undesirable.
- 2) Public access is currently walk-in only and will remain that way after conclusion of the sale.
- 3) The area is not heavily hunted due to a scarcity of game, proximity to residences and access control by adjacent landowners.

EXECUTION

Upon execution, this Finding becomes part of the Final Environmental Assessment for the Gladstone Creek Timber sale.

Signed  12/2/98
 Garry Williams
 Forest & Lands Manager
 Central Land Office

Amended FINDING to the Environmental Assessment

For the

Gladstone Creek Timber Sale
Sections 14, 23, 26, 28, and 34, T15N-R5W

INTRODUCTION

In November 1998, an Environmental Assessment (EA) was prepared for the Gladstone Creek Timber Sale. The EA evaluated 4 alternatives that were distinguished primarily by differences in access routes. A fifth alternative, accessing the sale area by using existing roads on French Creek was dismissed early on due to clear indication by two of the affected landowners that road use permission would not be granted. A Finding for the EA was prepared in December 1998 in which an alternative was selected that would access the sale area from French Creek on new roads constructed entirely on state land. However, the timber sale proposal was not implemented due to the lingering possibility use of existing roads could be negotiated with private landowners. Since then, a change of land ownership in French Creek and a new proposal for use of existing roads has led to successful right-of-way acquisition by the DNRC. Consequently, the new circumstances has led me to review the original EA and Finding to determine if the analysis and decisions remain appropriate.

ALTERNATIVES UNDER CONSIDERATION

Only two alternatives remained selectable in the Final EA dated, November 1998, the No Action and Alternative D, that would construct road entirely on State land from French Creek to the sale area. Two alternatives, accessing the sale area from Gladstone Creek could not be selected because agreement for road use could not be negotiated with two of the affected landowners. Consequently, Alternative D was selected in the Finding dated December 1998.

The recently negotiated right-of-way agreements involves use of an existing road in French Creek and allows access to the sale area in a manner similar to Alternative D, the state land access alternative. However, since a greater length of existing road can now be utilized, an estimated 3600 feet of new road construction can be eliminated from the selected alternative. The proposed harvest units, prescribed treatments and volume removed would remain the same as the selected Alternative D. Therefore, given the new information, I have decided to modify the selected Alternative D to utilize the negotiated R/W on private land to access the sale area for the following reasons.

- 1) The new access route eliminates the need to construct approximately 3600 feet of new road on state land.
- 2) A bridge crossing of French Creek can be installed at an existing ford site rather than a new crossing location further down stream. The existing crossing site is more suitable for a bridge than the previously selected location and will result in a much better road crossing design.
- 3) The potential to impact water quality will be reduced. A portion of the previously planned road construction on state land was on steep slopes directly above the stream crossing and would have required end hauling of excavated material to prevent introducing sediment to the stream channel. The existing ford site is well located and will not result in any additional road construction near the stream. Improvements to drainage features on the existing road and installing the bridge at an existing crossing will address an existing sediment source to French Creek.

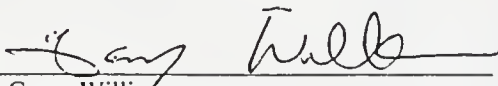
- 4) Use of the existing road will allow control of road use in French Creek at the existing locked gate to continue. The previous proposal would have constructed a new road and bridge crossing on French Creek between the Wolf Creek County Road and the existing locked gate. The current proposed installations are beyond the locked gate and allows private landowners to maintain control of road use thereby addressing their primary concern

SIGNIFICANCE OF POTENTIAL IMPACTS:

I have reviewed the Gladstone Creek EA and determined the analysis conducted for the sale proposal is still appropriate. The modifications proposed for the selected alternative are not substantial, the anticipated impacts are within the scope of the analysis and significant impacts will not occur as a result of the modifications.

EXECUTION

Upon execution, this Amended Finding becomes part of the Final Environmental Assessment for the Gladstone Creek Timber sale.

Signed  5/1/00
Garry Williams
Forest & Lands Manager
Central Land Office

Revised 5/1/00

Gladstone Cr.
Harvest Units
and Roads

unit

existing rd

new rd

Road that would have been
built under original decision
and will no longer be needed.

